MARCH 1995

PC Computing

Find Everything!
Do Anything!!

ONLINE

Think it's **too damn hard** to find

the good stuff on the Net?

No way! Wait 'til you

see what we've

got **for you!**

See It Here First!
IBM's New Butterfly
You Won't Believe Your Eyes...

**INTRODUCING
THE NEC MULTISYNC®
XE SERIES.
THE SHARPEST,
BRIGHTEST,
MOST PRECISE
MONITORS
YOU'VE EVER SEEN.**

THE ONLY THING T
FINE LINE BETWEEN

Three years ago, we embarked on a mission. To design and build the finest computer monitors in the world. Which is a rather ambitious quest. After all, many industry experts already considered the NEC MultiSync monitor, first introduced just over a decade ago, pretty darn close to perfect.

Now, for a company known the world over for technological achievement, our mission was relatively untechnical: To build a line of computer monitors that were so crystal-clear, so brilliant, so easy to control, people would actually look forward to working with them.

The result? NEC is proud to introduce the MultiSync XE Series of Monitors.

To make things perfectly clear, these monitors feature our unique OptiClear™ surface that virtually eliminates glare, an Invar shadow mask that assures maximum brightness without loss of focus, and a super fine .28 mm dot pitch. In addition, the XE Series features flicker-free, rock-solid refresh rates of up to 120Hz.

Then we packed them with features that make them easier to work with. Our On-Screen Manager, OSM™ for short, offers on-

NEC offers integrated accessories for enhancing X Series monitors including AudioTower speakers and Monitor Lens.

screen controls with animated icons that visually demonstrate your options. OSM allows you to control everything from screen geometry and screen size to color temperature. (A veritable field day for Type A personalities.)

We're also the first to offer compatibility with the new Microsoft® Plug and Play standard, which virtually eliminates configuration headaches while it automatically optimizes the monitor's performance*. MonitorManager™ software allows you to switch resolutions (for Macintosh®), utilize power management, and control color. People who spend all day in front of a monitor will be very, very pleased.

MultiSync XE Series

Flat square CRT, Plug and Play,
Digital On-Screen Controls, AccuColor®,
Energy Star, MPR-II, NUTEK,
Compatible with PC and Mac Systems

XE15
15" CRT, 13.8" viewable image size
Max Res: 1024 x 768 NI @ 76 HZ

XE17
17" CRT, 15.6" viewable image size
Max Res: 1024 x 768 NI @ 76 HZ

XE21
21" CRT, 19.8" viewable image size
Max Res: 1280 x 1024 NI @ 60 HZ

Every NEC monitor is backed by a three-year limited warranty. More importantly, it's backed by NEC's reputation for building the finest monitors in the world.

The new MultiSync XE Series from NEC. If you spend a few moments with one, we strongly believe you will never again think that "enjoy work" is a contradiction in terms.

For more information or the name of the nearest dealer call 1-800-NEC-INFO. For information sent directly to your fax, call 1-800-366-0476. Just ask for our document number 9301.

SEE, HEAR
AND FEEL THE
DIFFERENCE.™

NEC

AT 720 x 720 DPI, THE INK JET WILL

▲ Actual 720 x 720 dpi output from the EPSON Stylus COLOR Ink Jet.

HOW TO ECONOMIZE
(CALL COMPAQ D

Find Everything . . .
Do Anything . . .
ONLINE

Overwhelmed trying to locate the information you need from the vast online jungle? Relax. We'll help you pinpoint the most useful sites. But is it just a massive library, e-mail network, and social center—or a whole lot more? Here's how you can conduct business online—from tracking market trends and competitors to marketing your products and services to hiring staff. **112**

SNEAK PREVIEW ● SNEAK PREVIEW ● SNEAK PREVIEW ● S

New!
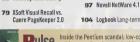
IBM Butterfly A remarkable subnotebook that will set your heart aflutter. **56**

Pulse

Help

Crossroads Quarter-inch cartridge vs. digital audio tape—two backup options face off. **188**

Edge

PCC on the Net Get wired and check out our new World Wide Web home page. **313**

Technolust

I KNOW
WHY I GOT
STARTED.

I
KNOW
WHY

I KNOW
WHERE
I'M
GOING.

I KNOW
THERE'S ALWAYS
A
BETTER WAY.

POWERFUL SOLUTIONS

Microsoft **Office**

WORD · EXCEL · POWERPOINT · MAIL · ACCESS

OFFICE PROFESSIONAL

MICRON

PC Computing

VICE PRESIDENT, EDITORIAL DIRECTOR
Paul Somerson

How to Contact the Editors We welcome feedback. However, we cannot look up stories from previous issues, recommend products, or diagnose PC problems by phone. Send comments or complaints to: 950 Tower Lane, 19th Floor, Foster City, CA 94404; fax us at (415) 578-7059; contact us via the Internet (72241,2451); or log on to PC Contact to post a public message (see page 316). Direct questions about the Help section to (415) 578-7657; 72241,2220 on CompuServe; or HelpPCC on America Online. PC Computing is under no obligation to review unsolicited products. All unsolicited submissions become the property of PC Computing. If you want to make a submission, contact one of the following editors—Features: Bill Roberts; News and Reviews: Wendy Taylor; Help: Yael Li-Ron. If you buy a product advertised in PC Computing, are dissatisfied, and can't resolve the problem, write (please do not call) Leta C. Fisher, Executive Assistant to the VP, Publisher, at the above address. Include copies of all correspondence.

LOOK AT YOUR

PENTIUM SYSTEM.

THINK IT HAULS ASS?

THEN HAUL YOUR ASS

TO THE STORE AND

LOOK AT THIS.

PORTABLE MAXIMUM.

Dock into the optional Desk Station IV for instant connection to your monitor, full-size keyboard, printer, and network.
The T4900CT with Desk Station IV is all the computer you need.

The 10.4" color active matrix screen displays 65,536 (64K) simultaneous colors for stunningly realistic images and brilliant graphics.

10.4" dia.

Take all your files with you, including full-motion video and multimedia with the 810 million bytes (=772MB) hard disk drive.

810 MILLION BYTES

indeo Indeo video bolstered by the 75MHz mobile Pentium provides smooth playback of full-motion and full-screen video.

The built-in sound system includes a microphone and speaker, plus ports for an external microphone and speakers or headphones.

Dual PCMCIA expansion slots (Type II and Type III) run simultaneously—for connection to your LAN, fax/modem and more.

like an AccuPoint™ integrated pointing device, 10.4" color active matrix display, and plug-and-play connection to peripherals. You can even blast MIDI and .WAV Audio through the built-in speaker or audio jacks for more dynamic multimedia presentations. See and hear this Pentium-powered touring machine today. **Call 1-800-457-7777 for the dealer nearest you.**

In Touch with Tomorrow
TOSHIBA

Setting: Lawyer's Office

Characters:
Jonathan Mattison: Lawyer
Kiki: Young wife of Victor
Victor: Kiki's husband who was presumed dead

After the reading of the will, Kiki and Mr. Mattison lock in a passionate embrace. However, they're unaware that Victor wasn't killed in the accident, and he has just arrived in Gateville.

Victor: Kiki! What's going on here? Unhand her, you beast! I thought you really loved me, so you could get my beloved Gateway 2000® PC!

Kiki: Now Anna tells me you're having an affair with my lawyer and you plotted to kill me just

Kiki: Why Victor! I thought you were dead! Anna lied! Victor you have to believe me. Of course I would love to have this potent PC with its powerful Intel® 100MHz Pentium™ processor, whopping 1GB hard drive, new TelePath™ IIv fax/modem, 16MB of RAM, ultra-fast quad-speed CD-ROM drive, ACS-31 speakers with heart-pounding stereo sound, 17-inch Vivitron™ color monitor, and Microsoft® Office Professional, Bookshelf® and Money *(inhale)* all to myself. But at its new low price of only $3,799 I could have easily bought it with my monthly allowance. Victor your fall was an accident! We couldn't find you! We thought you were dead! It's been a whole week since you died. I thought it would be okay if I started dating again. I have needs, you know.

Victor: It was no accident! Some burly guy wearing a ski mask and a shiny three-piece suit shoved me off the cliff.

Mattison: Cool it Victor. Kiki and I had nothing to do with your accident. Anna bribed me to read the will. Man, was she steamed that you willed the P5-100XL to Kiki and she only got Fifi, the Yorkie.

Kiki: Yes Victor, I'm sure Anna hired the hit man.

Victor: This is terrible. To think my own daughter would have me killed. I must go rescue Fifi. And as for you two, I'll have you know Kiki, Mattison is your long lost twin brother! It would have only been a matter of time before you found out through the Internet.

Mattison: Now that you mention it, I do see a resemblance . . .

Kiki: *(faints)*

Star-Studded Extras!

Dramatic values from Gateway 2000® These peripherals and software are sold only with the purchase of a system.

MULTIMEDIA

Audio Multimedia Kit
Here's everything you need to add multimedia to a Gateway PC.
- Gateway 2000 16-bit CD-quality sound card, compatible with Sound Blaster™ cards, with MIDI/game port, mic in, stereo line in/out
- 2 Altec ACS-5 speakers

$99 *(with system purchase)*

Wavetable Audio Multimedia Kit
Once you've heard wavetable audio, basic audio will never do!
- Ensoniq® Soundscape™ 16-bit wavetable sound card, MT-32 and FM mode compatible. Supports most software for popular sound cards and standards including General MIDI, Sound Blaster, AdLib, Roland MPU 401, MS Windows™ Sound Sytem and MT 32
- New Altec Lansing ACS-31 three-piece speaker system
- Blue Ribbon Sound Works' SuperJAM! jr. software

$209 *(with system purchase)*
$119 *(to upgrade from systems that include the 16-bit sound card and Altec speakers)*

Altec Lansing ACS-31 Speakers
A Gateway exclusive from Altec Lansing: a three-piece speaker set at a two-piece price. Two 3-inch free-standing speakers crank out up to five watts per channel while the subwoofer can deliver 15 watts of heart-pounding bass.

$99 *(with system purchase)*
$60 *(to upgrade from systems that include Altec speakers)*

Multimedia Software Flight Pack
Seven top-of-the-line flight CDs. Package includes TFX: Tactical Fighter Experiment, Aces Over Europe, Comanche, Strike Commander, Privateer, Wing Commander Armada and Warplanes. You also get a joystick and 20-disk storage rack. **$99**

MONITORS

Gateway 17-Inch Vivitron™ Color Monitor
Non-interlaced color monitor using Sony® Trinitron® tube technology, capable of 1280 x 1024 resolution in non-interlaced mode, .26 dot pitch.
Upgrade from a 14-inch CrystalScan™ 1024NI monitor **$360**
Upgrade from a 15-inch Vivitron monitor **$260**
(Upgrade prices good only at the time of system purchase.)

COMMUNICATIONS & STORAGE

New TelePath™ IIv Fax/Modem with Voice Messaging Center
Internal fax/modem, 14,400bps modem, V.32bis, with 14,400bps fax capability. With FaxWorks' Messaging Center you can receive, play and send voice messages. Includes a CompuServe® trial membership. **$99**

Colorado Memory Systems® TBU
250MB internal tape backup unit copies up to 9.5MB per minute. Comes with MS Windows and DOS® software, one tape and cable. **$149**

PRINTERS

Hewlett®-Packard 4L LaserJet Printer
A full-featured 300dpi printer loaded with enhanced PCL 5 and 26 scaleable typefaces with 1MB standard HP Memory Enhancement Technology. Includes parallel cable. **$699**

Hewlett-Packard 4P LaserJet Printer
A 600dpi printer for four times the dots of 300dpi laser printing with enhanced PCL 5 and 45 scaleable typefaces. 2MB standard memory and three universal SIMM slots available for additional memory or PostScript fonts. Includes parallel cable. **$999**

Epson® ActionLaser 1500 Laser Printer
A high-quality personal laser printer for users who require superior outputs! Features 300 x 300dpi, 14 resident fonts, 13 scaleable to any size; 1MB memory expandable to 5MB and a versatile, high-capacity 150-sheet input tray. Includes parallel cable. **$479**

Epson ActionLaser 1100 Printer
Get advanced laser printing at a personal laser price. Features include edge-smoothing technology for incredible sharp printing of text and graphics, 22 fonts and 1MB memory. Includes parallel cables. **$399**

Call for other printer options, including more Hewlett-Packard printers.

NETWORKING

3Com® Ethernet Adapters
Ultra high-performance 16-bit Ethernet cards from the world leader in Ethernet technology.
16-bit Triple Media Card supports BNC, AUI and Twisted Pair media **$109**
16-bit Twisted Pair Card **$89**

SMC® PCI Ethernet Adapter
Both Twisted Pair and BNC Connectors included **$149**

National Semiconductor Ethernet Adapters
Infomover™ brand NE2000plus™ Ethernet cards w/ 25-foot coax cable
Triple Media Card **$89**
Twisted Pair only Card **$69**

Token Ring Adapter
IBM® 16-bit Token Ring card **$429**

GATEWAY 2000
"You've got a friend in the business."™

8 0 0 - 8 4 6 - 2 0 6 2

Circle 140 on reader service card.

A WOMAN IN TORONTO
OF THE KIDS TO GRANDMA

BECAUSE HE GOT WARPED, A STOCKBROKER IN
SAN FRANCISCO SURVIVES A CRASH INTACT.

AN ASTRONOMY STUDENT IN OHIO
WARPS ONTO THE INTERNET. AND
DISCOVERS A WHOLE NEW WORLD.

AN UP-AND-COMING ARTIST IN SANTE FE WAS AMAZED
THAT HE COULD GET WARPED FOR UNDER $90.

A MAN IN NEW ORLEANS WARPS HIS WINDOWS
INTO POWER WINDOWS.

WARPS PHOTOS IN STOCKHOLM.

A MAN IN NEW YORK WARPS HIS COMPUTER SO HE CAN PRINT A REPORT, READ HIS E-MAIL AND FAX AN ORDER FOR A BLT. ALL AT THE SAME TIME.

IN RICHMOND, A MAN DISCOVERS WARPING IS SO EASY, HE DOESN'T HAVE TO ASK HIS 11-YEAR-OLD SON TO HELP INSTALL IT.

Introducing
OS/2 WARP

The new 32-bit,
multitasking,
multimedia,
Internet-accessed,
crash-protected,
Windows™-friendly,
easy-to-install,
totally cool way
to run your computer.

Available for
under $90.

OS/2 WARP
from IBM.

It's here.

See your local dealer
today. Or, call
1 800 3 IBM-OS2.

OS/2 WARP

IBM

THE GOOD, THE BAD, AND THE PENTIUM

Marketing Miscalculations

The good news is that Intel has finally agreed to replace all (not just some) of the Pentiums with the floating-point division problems. The bad news is that Intel has not had a real change of heart—it continues to assert that this is a minor problem, although customers think otherwise. Worse, Intel has failed to acknowledge that it was wrong to hide the problem in the first place. The questions the press should be asking are: Will Intel make timely disclosures of all problems in the future? Are there any other Pentium problems that Intel has failed to disclose?

JOHN NAVAS
DUBLIN, CALIFORNIA

Adding Up the Future

Intel needs to look back in recent history to two computer companies that "ruled the market." Hayes Microcomputer Products and IBM once both dominated their markets. The words "Hayes compatible" and "IBM compatible" were stamped all over, and we still see it today. These two supercompanies figured that whatever they introduced would become *the* compatible, but they were dead wrong. Now both companies find themselves struggling. Doesn't Intel realize this pattern in the PC industry? Just because you dominate the market doesn't mean everyone will follow you.

PAT MCCUSKER
PMCCUSKER9@AOL.COM

Bad Math, Bad Rep

I base much of my reputation on the facts that I get from your magazine. The question is: Why didn't you get the inside info on this Pentium flaw? I'm in charge of buying equipment for a major industry. Can you tell me more about the Pentium chip's potential errors?

ERNEST K. HUNTRESS
CIS: 75603,2650

REST ASSURED that your reputation could never sink as low as Intel's has in recent months. Why didn't we find the flaw before the math professors in Virginia or Intel's employees? Our tests didn't include "at risk" floating-point calculations—mainly because nobody outside Intel knew what they were until recently. Depending on whom you listen to, errors turn up between once in 9 billion divides or once in 100,000 divides—and we didn't uncover them in our tests. However, we do offer more information and quick fixes in this month's Pulse section on page 40. **ML**

The Internet Edge

Let me compliment you on the "PCs at the Crossroads" feature (January, page 166) by Howard Baldwin and Liesl La Grange. You're really on top of the computer and communications industry. But I have a question about your online offerings. You mention a few freeware and shareware items, but only make them available on CompuServe! Why not set up an Internet site and provide anonymous FTP to these files, as well as set up a World Wide Web server? The January

issue addressed future trends. My guess is that any company that doesn't have a Web server in three to five years will be behind in its competitive edge for customer promotion and access.

TED MCMICHAEL
TED@MITRE.ORG

YOU CAN ALWAYS reach us here at *PC Computing* via CompuServe, MCI Mail, or the Internet. As for downloading files, in addition to PC Contact, we now have a Web page called *PC Computing*'s Web Edition which provides files that you can ftp anonymously. Reach us at http://www.pccomputing.ziff.com/~pccomp. **RS**

We Speak Your Language

I just received my January issue and was very impressed with "PCs at the Crossroads." This combination of graphics and text makes complicated material easy to assimilate and digest. It's the kind of stuff that made me decide against the loquacious and voluminous prose of other magazines and opt for *PC Computing* instead.

My only suggestion would be to identify the acronyms. What do CISC, RISC, MPEG, INDEO, and SCSI stand for? I understood the concepts in no time (because of the excellent and simple graphics), and understood what the authors were getting at (because of the concise text). I look forward to this feature in future editions.

MICHAEL COX
CIS: 70750,2272

YOU'RE IN LUCK. Our Crossroads section in Help regularly delves into the emerging battles of computing technologies—and sheds light on the related acronyms. This month on page 188 we discuss QIC (quarter-inch cartridge) and DAT (digital audio tape) technologies. **JOC**

Obsolete and Now Free

Bravo! I finally found a John C. Dvorak column that deserves my support. ("Free the Code," January, page 75). If DOS is to

be dropped by Microsoft—and I fear Dvorak is all too accurate in his forecast—then Microsoft needs to give something back to the public. I vote for making DOS public-domain software. Windows has a long way to go before it meets my needs and desires. I still like my many DOS programs, especially WordPerfect. Let all DOS users rally behind Dvorak and tell Microsoft it's time to pay dues as a corporate citizen of the world!

RON STOTYN
GB9136@SIUCVMB.SIU.EDU

Caught in the Net

Your January "I-Way Patrol" refers readers to many cool files (page 307). But there is no file titled netlite.zip at ftp booklink, and no file at ftp garbo.uwasa.fi named gogame. I checked all directories at those locations. What's up?

M. MELANSON
TROLLONE@AOL.COM

AS YOU PROBABLY REALIZE, the Internet is in a constant state of flux, and many things change between the time we go to press and when you read the magazine. BookLink Technologies' FTP address is now correct; look for a file called beta4.zip. Part of the delay was because America Online purchased BookLink Technologies after we went to press. As for the game, go to http://www.loyola.edu/games.html, or find it on PC Contact, data library 8 (Misc.). **RS**

Hotel Hell

I just finished reading "Notebook Hell" (January, page 124). I appreciate your tests that try to replicate "real" work environments. I currently use Compaq's LTE Elite and agree that it's a great machine—except for the mouse.

Too bad hotels are still in the dark ages. Nothing is more frustrating than being in a hotel room and having to pull out the bed to unplug the phone so you can connect your computer. When will the hotel industry understand we work on our computers! A data port is not enough. How about a free outlet near the phone jack? Or have the phone on a desk rather than the night

table? I hate having wires criss-crossing my hotel room and then leaping over them to go to the bathroom. Not all hotels are bad, and it is a real pleasure when you stay in one that understands. I just wish it were more commonplace. I hope they are listening to their clients.

ANDREW LICKLY
ANDREW@FTP.COM

More Hell, Please

I liked "Notebook Hell," but hey, what happened to the real tough tests like the clothes dryer gauntlet? I think notebooks need a good shake-up to find out if the manufacturer bothered to solder everything properly. It is precisely because you have the guts to really torture notebooks that I decided to choose your magazine when it came time to subscribe. Keep up the sound work.

IMANTS BARUSS
LONDON, ONTARIO, CANADA

Telecommuting Breeds Diversity

Just wanted to let you know that your magazine is not only read by young males. I am an active member of SeniorNet online, teacher of computer courses, and I agree with John C. Dvorak's column about telecommuting ("Domestic Bliss," December 1994, page 75). It's the wave of the future. The greatest degree of job discrimination is based on age. Telecommuting would help eliminate this problem, because no one can tell if the person telecommuting is 8 or 80.

CONNIE ACTON
ConnieAct@aol.com

TRUE, ALTHOUGH references to SeniorNet might give you away. **JOC**

Apples and Blueberries

Paul Somerson's "Rupture Relief" column (December 1994, page 67) does a good job skewering the "coming rupture" prophecies expounded by Apple executives. It's also a good summary of where Apple may be headed. But there are a few debatable points.

First, it's not accurate to compare the Macintosh market share to that of Windows. Apple must sell a computer with its operating system, whereas Microsoft

only has to sell a few disks. Buying into the Mac world represents a significant investment, but buying into Windows is a no-brainer. A lot of Windows users never choose to use Windows at all. It comes preinstalled on PCs.

Second, some users run Windows only to play games. Yet they are counted as Windows users, and those machines are counted as part of the Windows market share.

Third, only time will tell if Apple was too late licensing its software, or if it should have done it at all. The IBM licensing deal makes good press, but Apple and IBM have been working jointly (and apparently in vain) on the Taligent operating system for several years. It's anyone's guess what IBM will do with the Mac operating system.

Apple is primarily a hardware manufacturer. Microsoft is primarily a software publisher. In a one-dimensional summary comparing market share, it appears that the two companies are competing in the operating system arena. But that's an illusion.

GREGORY JORGENSEN
RADIX@EWORLD.COM

Kudos to the Tag Team

Thanks for publishing articles by Vincent Chen and Woody Leonhard in the Help section! I thoroughly enjoyed and "programmed" their articles over last several issues of *PC Computing*. I will remain a regular subscriber as long as their articles find the way to your pages. Their easy style is a boon to this novice programmer, and their suggestions are extremely useful.

GREGORY Y. CHANG, M.D.
GYCHANG@HSC.USC.EDU

Uma's Revenge?

Where is Penn Jillette? I just opened my January issue and turned to the back page—*aaagh*, an ad! Did Penn upset the wrong people? Did the editors finally figure out that he never wrote about computers? Did Uma Thurman e-mail a complaint? Did the government read his column on censorship and shut him down? You can't just stick a page of advertisement on the last page and not even mention why that page doesn't have Penn's column. What happened to Penn Jillette?

LARRY TANNER
LARRY.TANNER@NETEAST.COM

Those PCs you were looking at yesterday have just become yesterday's news.

CREATIVE DIFFERENCES? A vanishing act? We can tell you it wasn't Uma's law suit or intervention from the Feds. We thought it was time to cultivate a new conspiracy theory. And based on all the Internet gossip, it seems we got just that. We suggest you check out Ed Bott's irreverent and informative insider's countdown to Windows 95, which now adorns the back page. **JZ**

Mightier Than the Penn

While I'm sorry to see Penn Jillette disappear from your back page, I really won't miss him. Gil Schwartz is a lot funnier and gives me useful information to boot.

BRYAN KIMSEY
BAKIMSEY@AOL.COM

Will Use Unix to Multitask

After reading the "obligatory" OS/2 and DOS/Unix letters (Mail, January, page 28), I have to agree that if someone wants a powerful, full-multitasking environment,

they should look at Unix. It may be difficult to use at first, but after a few weeks it gets easy to use. I have been using the Slackware version of Linux for the past two years and have found that it can be very helpful. It comes with full TCP/IP support of both SLIP and PPP, while having many good Internet programs (such as Mosaic) for X Windows (the only real Windows). It has its drawbacks, of course, but it's the best I've seen. Besides, it is free from the Internet at sunsite.unc.edu.

MIKE PLEMMONS
CIS:72603,1405

Clarifications
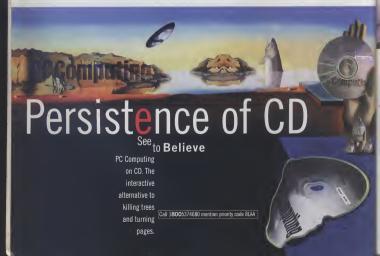
In the February feature, "The Ultimate Bargain" (page 124), the price for Zeos International's Pantera 90 should be $3,695.

In the "Notebook Hell" feature (January, page 124), the estimated street price for AST Research's Ascentia 900N system should be $5,098.

In the December 1994 "Editors' Choice" feature (page 150), it should be noted that Lexmark's Classic Touch keyboard with

the "eraserhead" pointing device is available only for the PS/2-type bus.

In "Editors' Choice" (December 1994, page 191), the e-mail address to get Mosaic should be mosaic-win@ncsa.uiuc.edu or you can telephone NCSA at (217) 244-3473.

SEND YOUR THOUGHTS TO Mail, *PC Computing*, 950 Tower Lane, 19th Floor, Foster City, CA 94404; fax us at (415) 578-7029; contact us via the Internet (jcury@pcc.ziff.com) or CompuServe (72241,2451); or log on to PC Contact to post a public message (see page 316 for instructions). Letters must be signed and include a daytime phone number. If you contact us via e-mail, please include your phone number, city, state, and authorization to print your e-mail address. All letters become the property of *PC Computing* and will be edited for length and clarity. For technical questions, please send e-mail to yli-ron@pcc.ziff.com or CompuServe (72241,2220). Please direct subscription questions, cancellations, and address changes to (800) 365-2770.

Imagine having enough disk drive capacity to handle the future.

Conner makes it a **Reality.**

Today's powerful desktop computers require more disk capacity for larger, more demanding applications. Like multimedia and video. It's a reality. You need more than 1 GB of capacity on your PC for everything you want to do. Fortunately, Conner has the disk drives to answer your needs.

Introducing Conner's new Filepro Series, featuring the first 1275 MB disk drive for entry-level PCs. This powerful new line of 3.5-inch IDE disk drives is available in capacities of 270, 425, 540, 850 and 1275 MB.

Typical capacities required for today's systems.	
Software:	120 MB (Windows, DOS, Word Proc., Spreadsheets)
User Files:	100 MB or more
Games:	30 MB each
Graphics:	40 MB
CD-ROM:	650 MB for each source
Video:	300 MB for each 15 min. segment
Audio:	20 MB for each 10 min. segment
Total:	Potentially more than 1 GB

And it's just the beginning, because the Filepro Series is designed to grow as your requirements grow.

Conner's new Filepro drives deliver high quality and high capacity – at very affordable prices. That's essential. Because the more capacity you buy, the better prepared you are to meet today's demanding software requirements. Plus, every new Filepro drive comes with a three year warranty.* It all adds up to a quality family of disk drives giving you the confidence to handle demanding applications now, and in the future.

And to backup your valuable data, ask about Conner tape drives in capacities to match every disk drive. Call **1-800-6-CONNER** today. And see how Conner is making data storage performance – and affordability – a reality.

CONNER
The Storage Answer.

PC Computing

Coming Soon

SPEED THRILLS: 100MHz PENTIUMS

Do you wait for a coffee break before opening your year-end budget? Does spell checking files take too long? What's your computer keeping you from doing? What's keeping you from a 100MHz Pentium?

FINANCIAL SOFTWARE FACE-OFF

You haven't balanced your checkbook since CP/M was in style. You have money stuffed in accounts from here to Switzerland, but you still don't know what you're worth. You need financial software and you need it now. We usability tested four top personal finance packages and we'll tell you which gives you the most bang for the buck.

WINDOWS 95 MYTHS

Windows 95 is due to ship sometime in the late summer or early fall. Its proponents have floated all sorts of promises about what the new operating system will do. We tell the real story behind the top ten most widely misunderstood myths, lies, and misconceptions about Windows 95. Knowing the truth may influence one of the most significant upgrade decisions you have to make.

AN INTERFACE NAMED BOB

Computers aren't all business, they're fun too. We'll show you how computers are becoming integral parts of everyday life with new interfaces (like Microsoft's Bob), global positioning systems, and even some incredible games.

ALSO NEXT MONTH

Crossroads Which network protocol serves your needs? Token Ring or Ethernet?

Working Smarter Set up a dedicated server using Windows for Workgroups to share resources such as CD-ROM drives.

Spec Watch Avoid traffic jams online with the right modem.

Training Does multimedia help software really help you learn software faster? We test Lotus 1-2-3's online training in our Usability Labs.

New! Complete office-in-a-box systems put fax, phone, and voice mail at your fingertips. Also, fax-on-demand for under $200, affordable color lasers, plug-and-play SCSI, and voice recognition for the rest of us.

38

Comparing Procomm Plus to WinComm PRO?
Just make sure you're comfortable with your decision.

Introducing Delrina WinComm PRO™ 1.1. It's the first truly powerful communications software that makes going on-line a pleasure. Instead of a pain.

As you'd expect, you get all major protocols, all popular terminal emulations, built-in script recording, a GIF Viewer to display graphics images, and a lot more. What you might not expect is to get them in a clean, crisp interface that's not only organized, it's fast, friendly and intuitive. And remarkably easy to use.

NOW With DELRINA INTERNET MESSENGER

But you also get features you won't find in Procomm Plus® Like a customizable icon-based phonebook. An integrated Backscroll Buffer with split screen capabilities. COM port sharing with WinFax PRO.™ And to help you sleep better, automatic virus detection as you download files.

There's even Delrina Internet Messenger,™ the easiest way ever to send, receive and manage e-mail on the Internet.

Best of all, you can get WinComm PRO in the Delrina Communications Suite,™ which also includes Delrina WinFax PRO 4.0, the best-selling, full-featured fax application in the world. Two best-of-breed products for one low price.

Call for information. Better yet, see your dealer and take home Delrina WinComm PRO today. You'll rest better tonight.

With WinComm PRO, all the most popular on-line services are just a click away.

DELRINA
1-800-776-9010

THE EASIEST WAY TO GO ON-LINE
Delrina WinComm

MVP
PIERIES
December 1994

May 30, 1994

Pulse

Where Money Goes Online
(percentage of dollars spent)

SOURCE: SIMBA INFORMATION

Online Wave: Consumer services—e-mail, chat sessions, and database surfing—are the smallest slice of the $11.33 billion online pie, but they're the fastest growing.

IC's and Sales
(percentage of market share)
- RAM
- Flash

SOURCE: FROST & SULLIVAN

Pick a Card: Falling flash prices are changing the way that portables remember. PC Card sales overall will increase tenfold to $5.8 billion by the turn of the millennium.

Where PCs Live with Kids

SOURCE: CHILDREN'S PARTNERSHIP

Empty Toolbox: In 1993, 47 percent of U.S. jobs relied on a computer. Although 39 percent of households with kids have PCs, not everyone is getting this important tool.

CHIP ERRATA

Pentium Happens

It's old news, but that doesn't mean the Pentium furor is history. Intel expected that owners of no more than 20 percent of the three million to seven million faulty Pentium chips would exchange them. So how do you know whether or not the Pentium you just bought (or want to buy) is one of them? And even if the processor is flawed, is the issue just a storm in an FPU?

It was hard to tell fact from sensationalism in the media frenzy that erupted last winter. Intel fessed up after the error was exposed by academics and said it had fixed the problem. Pentium owners were livid that they had never been informed.

Intel claimed that the average user would get a miscalculation once every 27,000 years. IBM came up with a different figure—once every *24 days*—and halted their sales of Pentium PCs. NexGen reported an "avalanche of demand" for its Pentium-clone Nx586 proces-

Unrepentium Inside: Test your Pentium with this equation. The correct answer is 0; if you get 256, your chip is flawed.

sor from PC vendors. Meanwhile, Pentium ads continued to air on TV, and online services were flooded with gripes and swipes at the would-be chip monopolist ("At Intel, quality is job 0.99999998"). As a result, Intel set aside $420 million to replace Pentiums—and boost their flagging stock prices.

So what's the problem with the Pentium? The floating-point division that trips up suspect Pentiums fails with "at

risk" numerators and denominators—namely those with binary representation that has long strings of consecutive 1s. To complicate matters, a number like 3.0 isn't at risk, but the result of subtracting 1.1 from 4.1 is. Intel's estimate of 27,000 years between failures was reckoned on 1,000 divides a day at one bad divide in 9 billion. IBM noted that spreadsheet recalculations can perform 5,000 divides a *second*. At 15 minutes

PHOTO ILLUSTRATION BY PETER ALAN GOULD PHOTO: UNIPHOTO

of recalculation a day, you'd rack up 4.2 million divides—or 9 billion in 24 days.

While you may not recalculate for 15 minutes every day, you're not out of the woods. An independent study at the University of California, Berkeley, came up with a Pentium floating-point error rate of one in 1,000 with "at risk" figures, and a typical error rate on the order of one in 100 million—about twice the error rate originally estimated by Intel.

All Pentium systems purchased last year include the flawed chip. At the time of this writing, Intel was already shipping a corrected version of the chip, but systems with the older chip may linger in the dealer channel for several months. Fortunately, software and hardware fixes for the flawed chips are readily available.

If you have a Pentium, check it with some simple math (see illustration) or download a utility from CompuServe. *PC Magazine's* PENTIUM.EXE and PENTIUM.WK1 test Pentiums using either Visual Basic 3.0's DLL or your favorite spreadsheet. You'll find both utilities in the file PENTIST.ZIP in Ziff-Net's Executives Online forum (GO ZNT:EXEC). See page 316 for log-on instructions.

If you discover that you're at risk, download a software fix to turn off the offending FPU (Eric Isaacson Software's FPUOFF .ZIP, also on Executives Online, is a good choice). Turning off the FPU means you'll take a performance hit, so you should also call Intel at (800) 628-8686. The company will send you a replacement chip (if you want to do the upgrade yourself) or refer you to an Intel service center where a technician will perform the swap for free. **ML**

Beam It to the Printer, Scotty

Now that infrared (IR) ports are turning up on portables from IBM, Gateway 2000, and Hewlett-Packard, why not **cut the wires** on printers? Extended Systems' **JetEye infrared transceiver** attaches to the parallel port of any printer so **IR-equipped portables** can beam jobs to them. A serial version, JetEye PC, transfers **data files.**

JetEye and JetEye PC / Extended Systems / (208) 322-7575 / $179 and
$135 est. street price, respectively / Reader Service No. 605
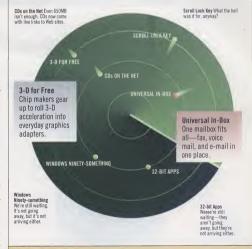
RADAR   32-BIT MULTITHREADED **WATERTREADING**

CDs on the Net Even 650MB isn't enough. CDs now come with live links to Web sites.

Scroll Lock Key What the hell was it for, anyway?

SCROLL LOCK KEY

3-D FOR FREE

CDs ON THE NET

UNIVERSAL IN-BOX

WINDOWS NINETY-SOMETHING

32-BIT APPS

3-D for Free
Chip makers gear up to roll 3-D acceleration into everyday graphics adapters.

Universal In-Box
One mailbox fits all—fax, voice mail, and e-mail in one place.

Windows Ninety-something
We're still waiting. It's not going away, but it's not arriving either.

32-bit Apps
Weeee're still waiting—they aren't going away, but they're not arriving either.

What's on the Scope? If it's near or moving toward the middle, pay attention to it. If it's moving off the screen, forget about it for now. Your time is too valuable.

Talking to Your E-mail, V-mail, and Faxes

The marriage of telephones and computers isn't always a happy one, but it's getting better thanks to products like **TeLANophy.** A new call-management and **voice-processing** service for wireless networks from McCaw Cellular and Active Voice, TeLANophy collects and sorts a company's **voice mail, incoming calls, e-mail, and fax messages,** and routes them through the LAN. Network users view and sort voice-mail calls and faxes like e-mail, or handle multiple incoming **cellular phone calls** from their Windows desktops.

TeLANophy / Active Voice / (206) 441-4700 / from $4,500 est. street price / Reader Service No. 613

The Forecast for Monitors Is Flat

The future is flat, if the latest crop of active-matrix LCD monitors for desktop PCs is any indication. Trim, low-powered, and free of potentially harmful electromagnetic emissions, flat-panel displays are a space-saving alternative to conventional CRTs.

To that end, CTX offers the 9.4-inch active-matrix CTX LMT-5020, which displays up to 4,096 colors at VGA resolution (640 by 480 pixels). The 5.5-pound panel comes with a sleek collapsible base or can be mounted on the wall.

Slightly more onscreen real estate is offered by the 13-inch NEC LCD1280 (which supports resolutions of up to 1,280 by 1,024 pixels at 16.7 million colors) and the 10.4-inch color Sharp QD-100MM. Radius is also at work on a variation of the flat-panel display that supports resolutions of up to 1,024 by 768 pixels. The LCD will use Radius's pivoting technology so the monitor can be oriented in either landscape or portrait modes. Radius expects to ship the rotating LCD later this year. **WT**

CTX LMT-5020 / CTX Int'l. / (909) 595-6146 / $2,495 est. street price / Reader Service No. 610
NEC LCD1280 / NEC / (800) 632-4636 / $11,755 est. street price / Reader Service No. 611
Sharp QD-100MM / Sharp Electronics / (201) 529-8731 / $7,995 est. street price / Reader Service No. 612

INTERNET ASSISTANT

Word Processing on the Web

How hot is the World Wide Web? At the current rate of growth, it's probably only a matter of time before every human on the planet has his or her own Web page. If you haven't gotten around to creating yours yet because the tools are too hard to use, it's time to find another excuse.

At press time, Microsoft was scheduled to release Internet Assistant by the end of January. This free add-in lets Microsoft Word for Windows read and write files in Hypertext Markup Language (HTML), the universal cross-platform Web document format.

The straight ASCII formatting codes in HTML aren't particularly complex—alphanumeric identifiers inside angle brackets define fonts, graphics, headings, and links to other Web sites—so adding Web support to Word is not much more difficult than adding a new import filter. And that means you can expect similar features from WordPerfect and Lotus before long.

The no-frills Internet Assistant lets you create Web pages by using Word's text formatting tools. To add graphics, just drag the file out of File Manager and drop it onto the page. To add links, paste in the URL. You can also use Word and Internet Assistant together as a bare-bones Web browser, although it will be more useful as a way to share interesting Web documents with cyberphobes.

You won't want to use Word as your full-time Web browser, any more than you'd use Excel to build an airline reservation system. Mosaic and NetScape will continue to be the tools of choice for dedicated Web surfers. Internet Assistant doesn't include tools for maintaining Web servers, so after you've created a stack of Web pages you'll need to find a home for them on a Net-accessible server. Watch for more complete Internet tools for word processors, spreadsheets, and other core applications to emerge from the Novell/WordPerfect alliance as well as from other companies.

Internet Assistant will be downloadable from Microsoft's FTP site (ftp.microsoft.com) and a variety of other sources, including the major online services such as CompuServe and America Online. **EB**

Internet Assistant / Microsoft / (800) 426-9400 / Reader Service No. 614

Vanity Press: Microsoft Word's Internet Assistant connects directly to Web sites such as the Microsoft Home Page.

REMEMBER WHEN THE SKY WAS

NOW IT'S JUST THE BEGINNING.

THE LIMIT?

Two perfect examples of this type of thinking are FireStorm192™ and FireStorm64™ Each raises the standard of PC graphics by delivering outrageous performance. Like ultra-high resolution and lightning-fast redraw rates.

This is only the beginning. Wherever you're going,

COMPARISONS	HIGHEST 24-BIT RESOLUTION	DATA PATH	WINTACH SCORE*
FireStorm192	1600 X 1200	192-BIT	298
Number Nine Imagine 128	1152 X 910	128-BIT	207
ATI Graphics Pro Turbo	800 X 600	64-BIT	152

*Tested in a 90MHz Pentium PCI machine at 800 x 600 x 24-bit

we'll be there. Making it possible. Delivering the tools needed to go beyond the boundaries of limited technologies.

So unlock the power of your mind. And give your great ideas the freedom to fly.

Call us now at 1-800-459-4RPC and learn more about the boundless possibilities of you and r.^{PC}

raise the power r^{PC}

radius.

Everything you need to know about project management software.

You're scrolling through screens. Shuffling cue cards. Wishing Microsoft Project had the power to organize by something as simple as who's responsible for what. But don't give up on project management software. Just think SureTrak Project Manager® for Windows.™

Think power. Other software doesn't take into account delays, changes, or the fact you might want another view of your project. Welcome to the real world. SureTrak shows the plan any way you like. Organize by phase, task, project, or responsibility. You name it. Plus, SureTrak sees a project the way it is—warts and all. So you get the real story, not a naive picture.

Think quick. Only SureTrak has Progress Spotlight.™ Just drag the data date and wham! A graphical to-do list of tasks, deadlines, and who's responsible appears right on your screen. Perfect for recording progress, too.

Progress Spotlight™ gives you a detailed look at upcoming activities.

But the screen isn't the only place SureTrak looks good. Think reporting. Easy-to-manage, colorful, sensible—even multiproject—reporting. SureTrak lets you slice and dice information to emphasize what's most important. And no matter what angle you choose, SureTrak's reporting gets action.

Thinking expensive now? Think again. Microsoft Project lists for $695. So does SureTrak. But you can get SureTrak from Primavera, the project management experts, for the introductory price of just $299.

More powerful. More affordable. SureTrak Project Manager is all you need to know. So think SureTrak. And act now.

PRIMAVERA
How the world says project management

Paul**Somerson**

Seven CD Sins

We like to get our hands dirty around here. We like to crawl under the hood and strip systems down to the solder. And our lab guys love squeezing software until it screams. But there's a special appreciation you get when you actually build a product from the blueprints up—which is what we just did with our new CD-ROM. And jeez, did we learn from it. (In case you haven't heard, users are calling the new *PC Computing* CD-ROM an honest-to-goodness breakthrough, a truly interactive multimediafest, a glimpse of what magazines will be like in the twenty-first century. Copies are limited, so if you want to get your hands on one, call (800) 537-4680 *really soon*.)

So here's our first-hand CD-ROM buying advice. Avoid the following CD sins:

CLUELESS CONTENT. Too many brain-dead vendors simply "repurpose" old material and trot it out again on plastic. Face it: Nobody wants to sit in front of a screen scrolling through text and bitmaps that look better and are easier to read on paper. Vendors need to create entirely new material with interactivity and multimedia in mind.

IRRITATING INSTALLATION. Cheesy installation routines become confused by even common hardware configurations, or ask users for technical data about their systems that they can't possibly know. Or leave enormous footprints on their disks. Or pollute system files and settings. Or make it hard to uninstall cleanly.

IDIOTIC INTERFACE. The worst offenders are the ones that rely on Windows 3.1 as the main interface. Even Microsoft (which is flogging new, improved Windows 95 features) now admits that this is a big mistake. CD interfaces are too often too complex and inconsistent, or rely on tiny cryptic icons or unintuitive Windows menu choices. Who needs this aggravation?

NONEXISTENT NAVIGATION. What's the point of having any information on a CD if you can't get to it? Too many CDs expect you to be mind readers (or worse—manual readers) who know what arcane commands you need to get anywhere. And most CDs make it painful to jump instantly to a favorite location or feature.

INSIPID INTERACTIVITY. We see this all the time. "It's interactive—you select a menu choice and you get a screen of text! Then, you just press the Page Down key and you see more text!" Wrong. That's not interactivity. That's just typing.

DUBIOUS DISCOVERABILITY. CDs sometimes offer terrific features that you'll never find because the vendor turned the disc into a treasure hunt, and you'll never fathom the twisted logic required to pry out the good stuff.

MURKY MULTIMEDIA. Sorry, but multimedia is not just tossing in canned trumpet fanfares. Or offering the same old "I have a dream" or Neil Armstrong moon dance clips. Vendors: Integrate voice, video, and sound the way they do in Hollywood. Or on TV. Be imaginative. But don't insult us, please.

John C. **Dvorak**

License to Kill

I've been writing a Q&A column for some daily newspapers, and for a number of years I did call-in type talk shows about computers. There were two questions that cropped up every so often. The first was always from someone who had just found a cheap used 286—or even the once-famed "turbo" 8088 machine—and they wanted to change from DOS 2.1. They wanted a copy of DOS 3.3 and wondered who sold old copies of DOS. The second question was simple but in some ways more interesting: "I just bought the WordPerfect upgrade. What should I do with the old copy? I'd like to give it to a charity or sell it to someone who could use it."

The answer to these questions was always a lecture on how software is licensed not sold, and how you can't give away or sell the old copy. The simple fact is that the notion of licensed software is now outdated. There is no reason that an old copy of Ami Pro, Word, or WordPerfect shouldn't be sold to a pal for $10 or whatever it's worth. Same for DOS and other programs.

The concept of licensing PC software was initiated by Seymour Rubenstein, founder of MicroPro (later to become WordStar International) as a stroke of genius. The idea was to minimize pass-around copies and piracy, as well as lock a customer into certain rules about usage as outlined on the license agreement. It was really aimed at businesses that had to buy a copy for each machine in the office.

Licensing Is Passé Although the software license was important when the industry was a fledgling business and it was easy to lose money, it is no longer useful. While companies such as Borland International and others have loosened some aspects of their agreement (users can run the same software on their personal laptop, for example) the whole licensing scheme should be abolished. These products are now more like Nintendo cartridges than $15,000 minicomputer line editors. Furthermore, today's new user has no clue about what the license means and responds more to the cornball "don't copy that floppy" message than to any wording on the back of a license agreement. Worse, licensing makes everyone a scofflaw. If someone has two machines at home plus a laptop, they aren't buying three copies of everything. It's idiotic. Software has become a personal possession, not a licensed artifact. "This is *my* copy of Word. I'll do with it as I please." This is how dumb it has become: Under some agreements I'd have to buy four copies of a package to run on a single-user, four-CPU power machine! The software is licensed to a single CPU, after all.

Then there's the practical aspect. As software has become a multimillion dollar business, prices haven't plummeted. Sure, things are a bit cheaper. But Word could sell for $15 and still make money. It outsells platinum music CDs. Why should it cost more than a music CD? And if a recording artist comes out with a new release, I can give away or sell my old one. Why can't I do this with WordPerfect? I can still recall ex-Microsoft honcho John Dickerson making the public comment to the effect that selling upgrades is sinfully profitable. If that's true, then why can't users recoup some of their losses by selling the old version to 8088 users who need the program? Since most software companies now charge for support, it's also a way to get more money to flow into the support profit center!

CD-ROM Solution Of course there's the fear that General Motors will put one $15 copy of Word on the network and that will be all Microsoft ever sells to GM. But a serial number program that doesn't allow more than one copy of a package to run at the same time would help and be enough of a nuisance that GM would have to buy more copies. Or, better, network killers that simply won't let the program run on the network at all. Each workstation would have to have its own CD-ROM. This latter notion (and note I said CD-ROM) is the future of personal computing. The idea that employees would bring their own tools to work has been minimized by fears of piracy and viruses, and by the dubious need to standardize. Two of these notions are eliminated by CD-ROM–based software and the abolition of software licenses. As we move to CD-ROM–based software, the perception will change and the idea of selling used CD-ROMs without concern for licenses will come.

In the most recent software piracy case I have researched, the entire licensing notion and computer software copyright restrictions were seen as ridiculous. This is the case of David LaMacchia, the MIT student who set up a pirate board. The case was dismissed because U.S. District Judge Richard G. Stearns said that by letting the case go forward it would open home computer users to prosecution for copying even a single program for personal use. In essence, Stearns saw that what we currently have in the way of laws and license agreements is simply ludicrous.

> **SOFTWARE** *has become a* **PERSONAL** *possession, not a* **LICENSED ARTIFACT.** *The current licensing* **AGREEMENTS** *are simply* **LUDICROUS.**

49

Gil**Schwartz**

CHIP SHOTS

You can imagine how upset I was when I realized that my Pentium didn't work. I spent enough money on it. That was a couple of months ago, six or seven minutes before I learned that the thing was a complete dud. I was mad, and I don't mind saying so. I had big plans for that machine. Now it's clear that it's never going to live up to my hopes for it.

Since the bad news came down, the guys over at Intel have decided to come clean and cough up a new chip. I'm thinking of taking advantage of their kind and generous offer. Before I do, though, I think I should probably take stock of the things my still-relatively-new machine can and cannot do:

It can load the 645 TrueType and ATM fonts on my system in a little under 20 seconds. My 486 did it in a little over 2 minutes.

It can load the entire annual report copy with scanned photographs and financial charts into QuarkXpress 3.3 in a little under 45 seconds, and scroll through the document as one would through actual paper. No more wading through the document like a foot soldier on patrol in the big muddy. I'm airborne.

It can load in the entire financial database of my billion dollar corporation, which is made up of 19 separate business units in 30 states. Each operation has its own section, with a six-year history going backward and projections through 1997 cross-referenced with assumptions about inflation, cost of money, and several other key variables. The document is so prodigious it used to be accessible in total only to machines running off the glacial mainframe huffing along somewhere in the wilds of New Jersey. Today I can pump in the entire massive numerical edifice and watch it spin and twirl. Nothing crashes. And if the occasional number is 0.0000000001 wrong, that's still a lot more accurate than the majority of our controllers, who think nothing of adding a couple hundred grand to their estimates of the bright and glorious future when they need things to balance out.

It can run CD-ROMs smoother than I ever dreamed possible. I thought it was the medium that was inherently flawed. Turns out it was my computer. Now sound and video modules run concurrently and everything. And 3-D solids move through space. Music plays without that gargling of razor blades effect well-known to all owners of 486s. Multimedia presentations flow with clarity and smoothness. Transitions work. Builds build. It can pop 3-D bar graphs without painting them segment by segment on the screen. This is something new, in case you don't know.

Best of all, when the work day is done and important matters must be attended to at home, my Pentium can run the upper levels of Doom without coughing up blood at the end of the floor when there are thousands of little imps, cacodemons, and Minotaurs concurrently heaving green balls of fire. My beloved old 486 lurched through the same chore so haltingly that I periodically missed shots while the machine caught up with itself, resulting in my death. I don't miss that.

Did I mention it can also defrag a one-gig hard drive in a little over an hour? I don't even want to tell you what that incredibly boring chore used to take.

That's just a partial list, of course. And that's fine, I suppose. But there are, on the other hand, a whole bunch of things my stupid Pentium cannot do:

It cannot divide a nine-digit integer by another one down to 16 decimal points or some damn thing like that.

It can't run Windows 95, because it hasn't been invented yet.

It can't calculate the effect a 0.03 rise in interest rates will have on the bond market three years out with the kind of certitude the gamblers in the market have come to expect, I guess. It's the brokers and real estate scientists who seem the most upset about this issue, anyhow.

It won't write this column for me. No matter which upgrade to Word I use, I still have to input my own text, although I hear the folks in Redmond are working hard on that. I wish them luck, believe me.

Oh . . . and it can't stand up to the PR department at IBM, or the righteous sword of *The New York Times*.

That's why I'm looking forward to getting my new Pentium chip that will right all wrongs, giving me a brand new computer without that annoying glitch, one capable of doing all the things that it can't do today. They tell me the new flawless processor is easy to install, and of course I've put chips into my motherboard several times. You just gently remove the old one (without damaging it, because it has to go back to Intel). Then you take the heart and guts of your future computer and gently press it into the old socket without twisting, folding, or messing up one single prong, because if you do, you won't have a

DEEP THOUGHTS *to make myself feel* **BETTER** *while waiting the* **REQUISITE** *27,000 years for my* **@$%! Pentium chip to fail. I'm still* **WAITING . . .** *only 26,999 and a half to go.*

Pentium anymore. You'll have a footstool.

Sure it's a little bit scary. But don't worry. I'm sure you'll get it dead, solid perfect—unless this is one of those times that come up once every 27,000 years or so when you don't.

And it's got to be done, right? Right?

V iewSonic has become synonymous with providing superior high performance color monitors to a demanding industry. As a recognized price/performance leader, we are committed to designing outstanding monitors that continue to win awards. In fact, here are some comments from a few editors:

PC WORLD *"Some folks crave performance. Some look for price. And then there are those who want it all. If you belong to the third crowd, the ViewSonic 17 is the monitor for you."* – **PC World; April 1994**

PC Computing BEST *"Best color quality, best sharpness and best versatility – what more could we ask of the ViewSonic 17? Frankly, we were surprised that one monitor could do it all."*
– **PC Computing; January 1994**

W *"ViewSonic has one of the sharpest, most detailed and well-focused displays around."*
– **Windows; September 1994**

Our *new* ViewSonic 17 monitor is loaded with features including OnView™ controls (on-screen menu to adjust screen images to your liking), ViewMatch™ (matches screen colors to printer output), ARAG® coating (virtually eliminates screen glare and reflection), <u>and</u> refresh rates up to 160Hz. No wonder this 17" monitor (15.7" diagonal viewable area) keeps on winning awards, generation ... after ... generation!

See. A

The Dif

New!

The Butterfly by IBM: A Notebook in a Subnotebook

The Future of Portables **Unfolds**

Ever since we watched George Jetson fold his car into a briefcase, we've wanted to do the same with our portable hardware. Now comes IBM's extraordinary Butterfly to perform this uncanny magic: It's little when you carry it, big when you put it to work.

Officially dubbed the Think-Pad 701C (although we prefer its more vivid code name, Butterfly), Big Blue's long-awaited subnotebook pioneers more technologies than any other portable since NEC ushered in the era of subnotebook computing more than five years ago with its 4-pound V20-class Ultralite. Although the Butterfly wasn't shipping at press time, IBM expects to make units available by April.

So where does the Butterfly's innovation reveal itself most? In usability: At long last you can buy a 4.2-pound PC that compromises nothing—that's right, *nothing*—in keyboard or display. At 7.8 by 9.6 by 1.6 inches, the Butterfly is smaller and lighter than Toshiba's Portégé T3600CT or Apple's Power-Book Duo, which together account for 70 percent of all subnotebooks used by businesspeople today.

Since a full-sized notebook keyboard requires at least 11 inches of width, how does the Butterfly pack one into 9.6 inches? The keyboard expands, literally. It's cut in half diagonally along a jigsaw pattern, which allows an extra row of keys to form when the lid is closed. Raise the display and each half of the keyboard slides outward. The right side of the keyboard then slides downward into position. Almost an inch of keyboard overhangs the subnotebook's chassis on either side when the display is raised. Close the Butterfly's display, and the keyboard pivots back into its 9.6-inch form factor.

The Result? George Jetson would be envious. You get the same superb keyboard that has been the trademark of full-sized ThinkPad notebooks. No other subnotebook matches its features: full-sized Shift, Enter, Backspace, and Tab keys; 12 large function keys, complete with the same spacing between F4/F5 and F8/F9 that's found on the keyboard of your desktop PC; dual Ctrl and Alt keys; and generous cursor controls that drop well below the right Shift key. Say what you will, but IBM knows how to make a keyboard, and the Butterfly's is simply outstanding.

As well it should be. Businesses have been reluctant to add subnotebooks to their pool of portables mostly because of small displays and cramped keyboards. Independent usability studies from Compaq, Toshiba, and IBM show that shrinking a keyboard by more than 10 percent of its normal size renders it too awkward for touch typing. Yet even keyboards shrunk by only 10 percent—the industry standard for all leading subnotebooks on the market today—still prove too

---

OVERVIEW Watch the Keyboard Spread Its Wings

ThinkPad 701C

ThinkPad 701C

Portégé T3600CT

Portégé T3600CT

Little and Big: With its lid closed the Butterfly is smaller and lighter than Toshiba's artful Portégé T3600CT. The big surprise is the full-sized notebook keyboard that emerges when the Butterfly is opened. Its gorgeous 10.4-inch color display is larger than most portable screens and a full 22 percent larger than the Portégé's.

Guide to the Ratings: ***** Excellent **** Good *** Acceptable ** Poor * Unacceptable

awkward. The Butterfly gives millions of people who had written off subnotebook PCs a compelling reason to reconsider the category.

The Better to See You
So does its 10.4-inch active-matrix color display (a dual-scan passive-matrix version, the ThinkPad 701CS, is also available). It renders more than 65,000 hues at 640 by 480 resolution. By comparison, the Portégé T3600CT comes with a puny 8.5-inch display. While we applaud the screen's bountiful real estate—yes, good enough for presentations before audiences of up to seven people—there's no SVGA adapter on the Butterfly except through the optional MultiPort II port

replica-tor. Ditto for the external keyboard and serial ports.

There's no serial port on the machine itself? Relax; there's no need for one. In addition to the two Type II side-mounted PC Card slots, the Butterfly comes with a 14.4Kbps DSP-based fax modem and infrared port.

The fax-modem DSP doubles as a 16-bit Sound Blaster-compatible sound chip. There are also headphone, audio-in, and audio-out jacks, a fairly good speaker, and a screen-mounted microphone. Presentations aside, the Butterfly's

sound capability lets it stand in as a telephone/speaker-phone and an answering machine. While not everyone will need such sophisticated features, the capabilities are there should you need them.

The rear-mounted infrared port conforms to the IRDA specification, which lets the Butterfly exchange files with Hewlett-Packard portables and desktops (at 115Kbps), Sharp handhelds (at 0.5Kbps), and the growing panoply of systems and PDAs that use infrared. Puma Technologies' TransXit is bundled with the Butterfly, providing file synchronization and one-way file transfers with any IRDA-compatible device.

In the rush for such splashy

ThinkPad 701C

Portégé T3600CT

Watch It Grow: Raise the display on the Butterfly, and the two halves of the keyboard spread apart. Then the right half drops into place to reveal a generous full-sized notebook keyboard, a luxury no other sub-five-pound portable provides.

New! Little Like a Sub, Big Like a Notebook

technologies, IBM didn't overlook the basics. The Butterfly we tested came with a 50MHz 486DX2, though Big Blue has already announced a 75MHz DX4 version. By our reckoning, a 100MHz DX4 can't be far behind. Accelerated video runs on a 32-bit VESA local bus. Performance overall was average for a 50MHz DX2.

The model we tested came with a stingy 4MB of RAM, expandable to 20MB. Drive options range from 270MB to

510MB, and the hard drive is removable. In addition, an ultra-thin external floppy drive plugs in to the machine's Enhanced parallel port (an adapter for connecting a standard parallel device is included).

The perfect portable? No. Battery life was about 2.5 hours in our tests with power management features set at half mast. We'd love to see the Butterfly adopt lithium ion technology in the upgrade. We'd also like to see the video port

migrate to the machine itself.

Sales of subnotebooks have sputtered and stalled despite some excellent offerings from Compaq, Toshiba, Hewlett-Packard, and IBM. The Butterfly eliminates key obstacles that have kept customers skittish. Rarely does the arrival of a single product transform a maturing category wholesale. Such is the Butterfly's good fortune. This is the subnotebook to covet; nothing else comes close. **MARTY JEROME**

Guide to the Ratings

In each applicable area—usability, performance, technology, and verdict—a product is awarded from one to five stars. In some cases, other factors (such as price) also affect a product's verdict.

★ ★ ★ ★ ★ **Excellent** A market leader that offers exceptional performance.

★ ★ ★ ★ **Good** Excels in a few areas; a good buy, though not perfect.

★ ★ ★ **Acceptable** Average for its class; a justifiable purchase.

★ ★ **Poor** Out-of-date or substandard, possibly offset by some positive features.

★ **Unacceptable** Missing necessary features or suffering from subpar implementation; avoid.

GUIDED TOUR — IBM'S BUTTERFLY, INSIDE AND OUT

Wired for Wireless: Thanks to a built-in infrared transceiver, the Butterfly can exchange files with a growing menagerie of IRDA-compatible devices, including PDAs and desktop PCs.

Leave a Message: Although there's no serial port, a fax modem with Sound Blaster-compatible DSP and a full complement of jacks are built in. The DSP chip doubles as a speakerphone.

Two-Pronged Attack: No extra baggage here. The AC adapter is smaller than a bar of bath soap, and pop-out prongs eliminate the need for an additional power cord.

No-Compromise Keyboard: Besides a full-sized QWERTY layout (shown here at actual size), you get large Backspace, Enter, Shift, function, and cursor controls. All other subnotes compromise on some or all of these keys.

PHOTOGRAPHS BY ERNIE FRIEDLANDER

Guide to the Ratings: ★★★★★ *Excellent*   ★★★★ *Good*   ★★★ *Acceptable*   ★★ *Poor*   ★ *Unacceptable*

Alexandre Patty had a rather distinctive approach to descending a staircase. Since he obviously preferred doing things the hard way, he probably wouldn't have been interested in faxing with Delrina WinFax PRO.

Given the choice between using an elevator or your head to go down a flight of stairs, you'd probably opt for the easier way, right? So if you're not already faxing with the award-winning WinFax™ PRO 4.0 fax software, you should be. Because it is, quite simply, the easiest and most convenient way to send and receive faxes. By faxing with your PC, you'll save countless trips walking to the fax machine. And WinFax PRO makes sending a fax from within any Windows application as easy as printing a document. Organizing sent and received faxes takes just a couple of mouseclicks, and you can even schedule a fax transmission for a specific date and time in the future. So visit your local dealer today, or call 1-800-664-2782 to upgrade or to order WinFax PRO, the world's best-selling fax software. Anything less is sure to be a headache.

WinFax PRO is available alone or in the Delrina Communications Suite.™

Year after year, Delrina WinFax PRO has won nearly every major industry award – for features like fax autoforwarding, remote retrieval and handy graphics tools, including one that lets you add your own signature. You also get dozens of ready-to-use cover pages, OCR, group faxing, drag-and-drop addressing, and you can even have a document faxed to some and e-mailed to others. No wonder *PC/Computing* recently said, "The best fax software just got a whole lot better." **DELRINA**

Panasonic PFC KX-SP100

It Prints, Copies, Faxes, and Zooms

Nobody's desk has space to spare, especially when it's sitting in a small or home office. Yet almost everyone wants the convenience of a personal fax machine, a photocopier, and a printer right at hand.

The Panasonic PFC KX-SP100 (better known to its friends as the Panasonic PFC, for printer/fax/copier) checks in at the same sub-$800 street price as Hewlett-Packard's all-in-one OfficeJet (see "HP Turns a Business Triple Play," December 1994, page 83). But by cramming its printing, faxing, and photocopying circuitry into a minitower configuration, the Panasonic PFC takes only a couple of square feet in desk real estate. Even better, its 300-dpi LED print engine churns out fast, clean printouts and plain-paper faxes you can't fault.

Snappy Printing The Panasonic PFC is also a strong performer, with speeds slightly faster than the OfficeJet for text documents and nearly 50 percent faster for graphics-laden documents. The 10-sheet input tray, which sits upon the 70-sheet paper tray, lets you fax or photocopy multiple pages by merely pressing a few front-panel controls. To direct faxes, however, you have to plug in a telephone—unlike the OfficeJet, it has no dialing pad.

After living with the Panasonic PFC for a while, a few of its design details started to annoy us. For example, the sheet-feed photocopying mechanism doesn't handle newsprint or other low-grade paper very well. Clearing the paper jams that occur when you forget this often leaves behind tough-to-extract remnants. Also, the

printer's paper feeder clangs as it takes up paper—not ideal for long printouts—and the paper-tray capacities are smaller than the OfficeJet's (though the Panasonic PFC's smudge-free, toner-based output is superior to the OfficeJet's).

Very Versatile If you can overlook these few inconveniences, the Panasonic PFC has a lot going for it. It performs some clever scaling: Incoming faxes transmitted at the standard 200-dpi resolution are automatically sharpened to an enhanced 300 dpi for better looks. And if you photocopy a legal-sized document or magazine clipping, it's

scaled down automatically to fit onto a letter-sized page. This scaling sometimes makes type look squat, but it remains legible nonetheless.

If space is a real problem in your office and you need fast printouts, the Panasonic PFC is the multifunction device you've been waiting for. Also, its output quality is slightly better (and more permanent) than the OfficeJet's ink-jet output. But if you're a frequent faxer, you'll be better off with the OfficeJet. The Panasonic PFC's lack of a built-in keypad forces you to fiddle with your phone each time you're ready to fax. **MATTHEW LAKE**

Three in One: Of the devices we've seen that combine printing, faxing, and photocopying in one machine, only Hewlett-Packard's OfficeJet and the Panasonic PFC are compact enough in size and low enough in price to fit into a small or home office.

PICKS   OFFICE **TOOL KIT**

Fast, smudge-free printing in a small form factor	Panasonic PFC KX-SP100
Ink-jet printing and built-in fax keypad	Hewlett-Packard OfficeJet

---

USABILITY: *Requires frequent paper refills and connection to phone for faxing.* ★★★
PERFORMANCE: *Cranks at a fair pace compared to ink-jet models.* ★★★★½
TECHNOLOGY: *Toner-based 300-dpi printer, plain-paper fax, and sheet-feed photocopier all in one space-saving box.* ★★★
VERDICT: *Three sound (and affordable) office products in the smallest conceivable footprint.* ★★★★

High-Rise SOHO Tool: Buy floor wax and get dessert topping in the bargain. The Panasonic PFC crams a 300-dpi printer, fax machine, and batch-mode photocopier into a minitower to save on desk real estate (45-degree paper trays notwithstanding).

FILEBOX

Panasonic PFC KX-SP100

Print Features: PCL 4 emulation, 300-dpi LED printing, 70-sheet paper capacity, built-in handling for single envelopes, 2MB of RAM.

Fax Features: Group 3 plain-paper fax, 18-page incoming memory.

$799 est. street price
Panasonic Communications & Systems
(800) 742-8086, (201) 348-7000
Reader Service No. 622

Gateway Lightens the Load

Face it: No one cares about the stiff neck and sore shoulders you get from schlepping around a 10-pound notebook computer all day. If your pleas for a subnotebook have fallen on deaf ears, Gateway 2000's Liberty may win you a new audience with those who clutch the company purse strings.

Like Toshiba's crafty Portégé T3600CT, the Liberty strikes a shrewd balance between heft and functionality. At 8 by 10 by 1.6 inches and 4.2 pounds, it's slightly wider and heavier than traditional subnotebooks such as Compaq's Contura Aero (with AC adapter) and IBM's ThinkPad 510CS—both splendid portables that have failed to generate broad corporate sales.

For the extra girth, though, the Liberty packs features that businesspeople have been reluctant to forgo. Among these: a 50MHz 486DX2 or 100MHz DX4 processor, a video accelerator on 32-bit local bus, 8MB of RAM (expandable to 20MB), a splendid 10.4-inch dual-scan passive-matrix color display capable of 256 colors at 640 by 480 resolution (and SVGA on an external monitor), and a 340MB removable hard drive (with 540MB and 720MB options).

On the Wire Besides the standard set of serial, parallel, VGA, and keyboard/mouse ports, the Liberty features two PC Card Type II slots and two-way infrared capability. Designed according to specifications of the Infrared Data Association (IRDA)—which therefore makes the Liberty compatible with Sharp and Hewlett-Packard devices—the wireless link can exchange data at 115.2Kbps from a distance of up to 4 meters. Best of all, a serial infrared receptor for

desktop PCs is also included.

For a subnotebook, the Liberty's usability is a mixed bag. Fingers move nimbly over the QWERTY keys, which have 90 percent of the spacing that keys on traditional notebooks have. The tiny Backspace and Enter keys do little to slow your touch typing, and even though cursor controls are half-sized, they're situated well below the right Shift key—far less confusing than having the up-arrow key positioned to the right of the Shift key as it is on many subnotebooks.

Typing agility is helped immensely by a generous 3.6-inch wrist rest and 1-inch rear legs that prop the machine up at a comfortable angle. Still, we have two complaints: The function keys are simply too small

(moving the Pause and Print Screen keys to a desolate area of the keyboard would help), and the position of the EZ Point pointing device is awkward.

While the Liberty's keyboard could take a few lessons from Toshiba's Portégé—or IBM's new ThinkPad 701C (see "The Future of Portables Unfolds," page 56)—its bang for the buck is alluring. Prices start at $2,799 for a 50MHz DX2 with 8MB of RAM and a 340MB hard drive.

Take Note The Liberty nicely complements Gateway's ultralight HandBook 486 and its ColorBook notebook. And given its power, expandability, huge display, and light weight, the Liberty gives good reason to bypass 7-pound notebooks altogether.

MARTY JEROME

Big and Bright: The keyboard on Gateway's Liberty is cramped, and its pointing device is oddly placed, but the 10.4-inch color display is roomier than those found on most full-sized 7-pound notebooks. ****

Breaking Away: The Liberty raced ahead of MidWest Micro's 33MHz 486SX Elite SubNote, thanks to its 100MHz DX4 processor and 256K cache. The Liberty's battery life was less impressive.

Speedy Staying Power

Windows Performance

GATEWAY 2000 LIBERTY — 52% Faster

MIDWEST MICRO ELITE SUBNOTE — Baseline

Battery Life (Hours:Minutes)

GATEWAY 2000 LIBERTY — 2:24

MIDWEST MICRO ELITE SUBNOTE — 2:40

NOTE: WINSTONE 95 RUNS 13 OF THE MOST POPULAR WINDOWS BUSINESS APPLICATIONS. ZDIGIT BATTERY RUNDOWN TEST MECHANICALLY SIMULATES KEYSTROKES.

FILEBOX

Liberty

Competition: Hewlett-Packard's OmniBook 600 and Toshiba's Portégé T3600CT compete in features, while MidWest Micro's Elite SubNote competes in price.

Features (as tested): 100MHz 486DX4, 8MB of RAM, 340MB hard drive.

Configuration Options: 50MHz DX2 with 8MB of RAM and a 340MB hard drive ($2,799), external floppy ($79).

$3,279 est. street price
Gateway 2000
(800) 846-2000
Reader Service No. 623

Guide to the Ratings: ***** *Excellent*   **** *Good*   *** *Acceptable*   ** *Poor*   * *Unacceptable*

600 dpi-class
output
on a 300 dpi
budget.

The OL410e prints presentation-level output at a simple-text-and-graphics price.

It's designed for laser class output so you can print great looking sales presentations, newsletters and direct mail flyers easily and affordably.

The LED printhead carries a 5 year limited warranty and the print speed is a fast

Circle 118 on reader service card.

The
OKIDATA
a Division of Oki America, Inc.

OL410e and 410e/PS

* *Personal Printers.*

4 pages-per-minute.

And there's also a Mac version with Adobe® PostScript™— the OL410e/PS.

To take advantage of this opportunity at a dealer near you, call 1-800-OKI-TEAM, ext. 563 (U.S. or Canada).

YOUR BUSINESS HAS NEVER LOOKED BETTER.™

Pick a Card, Any Card

PC Cards are for portables, right? Not anymore. Portables need easy expansion in a small frame, and that's exactly what PC Card peripherals deliver. But imagine having that same easy expansion from a drive bay on your desktop PC.

If your data requires tight security, you can use a PC Card hard drive and lock it in a safe. Or you can take hundreds of megabytes of data with you on the road. Better yet, instead of buying separate high-speed fax modems or network cards for your desktop and your portable, you can buy one add-in card that services both.

Two companies, Databook and SCM Microsystems, are betting that scenarios like these will make PC Cards a desktop hit. Databook's ThinCardDrive and SCM's SwapBox Classic Combo each occupy one 3.5-inch drive bay and ship with a kit that includes all the hardware and software you need to get started.

The Skinny Databook and SCM take different approaches with their drives. The ThinCardDrive holds two Type II cards or one Type II card and one Type III card (typically a hard drive) at a time—perfect if you need access to two such devices at once. The SwapBox Classic Combo, by contrast, supplies a standard 3.5-inch floppy drive along with space for one PC Card that can be either Type II or III. If you're tight on drive bays, the Swap-Box Classic Combo is the solution for you.

Installing one of these drives is akin to adding an internal floppy drive to your system: slide it into an open drive bay and connect to a standard 16-bit ISA host card. SCM and Databook are leaders in providing

Pass the PC Card: SCM's SwapBox Classic Combo (left) and Databook's ThinCardDrive (right) both let you easily share PC Card peripherals such as modems, SCSI controllers, network cards, hard drives, and RAM cards between portable and desktop PCs.

PICKS EASY DESKTOP EXPANSION

Access to two PC Card peripherals at once	Databook ThinCardDrive
PC Card and floppy in one drive bay	SwapBox Classic Combo

card and socket services to notebook makers, but setting up their software wasn't easy.

Slow Start Memory conflicts presented the biggest installation headaches. To get the drives up and running, we had to manually exclude sections of upper memory for the requisite software drivers—not a fun way to spend your afternoon. Most of the drivers loaded high, but when we ran out of space in upper memory, the ThinCardDrive snatched 50K of conventional RAM, while the SwapBox Classic Combo nabbed just 31K.

Once the memory conflicts were resolved, however, putting the drives to work was a

breeze. To test for Plug and Play compatibility, we tried the drives with a number of PC Card peripherals, including Maxtor's MobileMax 105MB hard drive and the TDK DF 14.14 fax modem. The drives recognized them all. The ThinCardDrive and SwapBox Classic Combo make installing a new hard drive, fax modem, or network card as easy as inserting a floppy disk.

If you have only one drive bay to spare on your system and want PC Card expansion, the ThinCardDrive is your drive. For access to two PC Card peripherals at a time, however, the SwapBox Classic Combo is our pick. **ADAM MEYERSON**

ThinCardDrive

USABILITY: *Installation is tricky, but after that it's just Plug and Play.* ★★★
TECHNOLOGY: *Holds two Type II or one Type II and one Type III cards.* ★★★★
VERDICT: *An inexpensive way to shuttle several PC Cards between portable and desktop PCs.* ★★★★

SwapBox Classic

USABILITY: *Tough to install, but the Plug and Play is worth it.* ★★★
TECHNOLOGY: *Holds a Type II and floppy drive; no Type III support.* ★★★
VERDICT: *Easy PC Card expansion for systems with a single drive bay.* ★★★

FILEBOX

ThinCardDrive

Competition: Cardwell's CardBay 20200-1, Greystore Peripherals' Card Dock GS-220.
Capacity: Two Type II PC Cards or one Type II and one Type III PC Cards.
Included: Drive, interface card, cable, software.

$170 est. street price
Databook
(716) 292-5720
Reader Service No. 624

SwapBox Classic Combo

Competition: Cardwell's CardBay 20200-1, Greystore Peripherals' Card Dock GS-220.
Capacity: One PC Card, which can be either Type II or Type III.
Included: Drive, interface card, cable, software.

$169 est. street price
SCM Microsystems
(408) 370-4888
Reader Service No. 625

Guide to the Ratings: ★★★★★ *Excellent* ★★★★ *Good* ★★★ *Acceptable* ★★ *Poor* ★ *Unacceptable*

Cheapest Laser Money Can Buy

Laser printers just don't get any cheaper than the Brother HL-630. Rather than plopping down $400 for an ink-jet printer and hoping your associates will be fooled by the "almost laser-like" quality of its output, you can spend the same amount for the real thing.

The Brother HL-630 gives laser printing a whole new meaning with its ridiculously low price. Even better, it doesn't force you to make sacrifices. With sharp text output and a 6-page-per-minute (ppm) engine, it's tough to go wrong.

Bits and Pieces The Brother HL-630 is your basic no-frills printer. However, we found setup to be a bit tricky, requiring separate installation of the drum and toner cartridge. And the instructions for this were short on explanation and long on unclear illustrations.

Driver installation, on the other hand, required little effort, and we had it printing in no time. Oriented toward SOHO users, the drivers for the Brother HL-630 are fairly user-friendly, though we'd like to see more graphics and less text in the setup dialog box. Also, an online guide or tutorial similar to Canon's Visual Guide or Hewlett-Packard's Explorer would be a nice touch.

Another thing missing on the Brother HL-630 is an on/off switch. Not to worry, though, because this printer is Energy Star compliant and powers down when not in use. You can configure the printer to "sleep" when you haven't used it for anywhere from 1 to 99 minutes. Of course, this causes some minor delays as you wait for the printer to power up after being idle, but that's a small price to pay for the energy savings.

Luxuries of Laser: The Brother HL-630 features 300-dpi output, a 6-page-per-minute engine, and a small footprint that should rest nicely on any desk. At only $399 on the street, it's an excellent personal printer.

Dark Star: While text output on the Brother HL-630 will easily serve your everyday needs, graphics tend to be a little dark. This creates less definition within images (even clip art) and makes for unimpressive gradients.

a laser printer. But soo won't dream of printing most important docume

If you print mostly text, you'll be quite pleased with the Brother HL-630. It ships with 21 resident bit-mapped fonts and 24 TrueType-compatible scalable fonts. Text output is crisp and distinct—much better than even the best ink-jet printer—and should serve you well for printing reports and text-laden documents.

Graphics output is adequate, provided your needs don't extend beyond the occasional piece of clip art. The images it produces are on the dark side, which creates a loss of contrast in gradients and shading. And the graphics aren't nearly as smooth as a 600-dpi laser printer like

Hewlett-Packard's LaserJet 4P (which costs about $800 more than the Brother HL-630).

Swift Speeds While the Brother HL-630 won't win any awards for speed, it's a snappy performer compared to other printers in its price range. It's significantly faster than any ink jet we've tested, and the 6-ppm engine churns out pages at an acceptable clip. Most lasers that come close to this price have 4-ppm engines, so in the long run, this printer's raw engine speed puts it ahead of other low-cost lasers.

The Brother HL-630 ships with 512K of memory—not much if you're printing lots of

high-resolution graphics. You can upgrade the memory to 2MB, but even that's not suited for heavy graphics. The printer also ships with a multipurpose paper tray that supports varying paper stocks and envelopes.

If you're in search of an inexpensive, no-nonsense laser printer, the Brother HL-630 fits the bill. You can't beat its price, and the speed and output quality are sufficient for most tasks. But if you're planning on graphics-oriented printing or require high standards for graphics output, your money may be better spent on a 600-dpi printer such as the Laser-Jet 4P. **KYLA K. CARLSON**

FILEBOX

Brother HL-630

Competition: Hewlett-Packard's LaserJet 4P.

Features: PCL4, 300-dpi output, 512K of RAM (upgradable to 2MB).

Resolution: 300 by 300 dots per inch.

Cost per Page: Approximately 2.5 cents, including paper and toner, assuming 5 percent coverage.

Engine Speed: 6 pages per minute.

Font Support: 21 resident bit-mapped fonts, 24 TrueType fonts.

$399 est. street price
Brother Int'l.
(908) 356-8880
Reader Service No. 626

Guide to the Ratings: ***** *Excellent* **** *Good* *** *Acceptable* ** *Poor* * *Unacceptable*

Decorate Your Documents

The longer you wait to buy a color ink-jet printer, the tougher your choice will be. Why? Because the best-selling Canon BJC-600 just got better.

On the surface, the Canon BJC-600e looks just like the BubbleJet printer we've grown to know and love. It still sports a petite design that saves precious desktop real estate. But now it has a lower price, enhanced print speeds, and easy-to-use software. In addition, Canon has improved output quality by upping the black resolution to 720 by 360 dpi and the color resolution to 360 by 360 dpi.

The Color Advisor software is another new addition. Select this option and the software will automatically add to or enhance the colors of your documents following guidelines that you help establish. For example, if you want to

print your volunteer organization's newsletter, you can select the audience, style, occasion, and setting, then the software will add colors accordingly. While this is an entertaining feature, we wouldn't use it when color really counts.

Despite its many enhancements, we have to give the output of the Canon BJC-600e

mixed reviews. The colors look great—vibrant and clean—but the text is pale and not nearly as crisp as that of its sibling, the Canon BJC-4000.

The Canon BJC-600e isn't the cheapest portable printer out there, but its diminutive size, good speed, and vibrant color output keep it in the running. **KYLA K. CARLSON**

Canon's Compromise: The Canon BJC-600e is fast and inexpensive, but the trade-off is mediocre text output. Color prints, on the other hand, are vibrant and clean.

Quad-Speed CDs: Four Times the Fun

In the relentless drive toward faster peripherals, you already know that you need a quad-speed CD-ROM drive: Prices are dropping, and applications that require 600Kbps transfer are coming. Teac's SuperQuad 4X AT CD-ROM and NEC's MultiSpin 4Xe are object lessons in how to buy a quad-speed CD-ROM drive.

These drives are widely different in price—the SuperQuad 4X costs less than $300, while the MultiSpin 4Xe is more than $400. Also, the SuperQuad 4X is a caddyless solution with minimal controls, while the MultiSpin 4Xe uses caddies but sports an LED status screen and

MultiSpin Does All the Work

Free CPU Processing Power

NEC MULTISPIN 4Xe	65% More
TEAC SUPERQUAD 4X AT	2% More
NEC2 RECOMMENDATIONS	Baseline

NOTE: WIDEST MEASURES BOTH TRANSFER RATE AND DRAG

Drag Race: The SuperQuad 4X AT uses a sound card's interface, which strains performance.

the MultiSpin 4Xe uses a 16-bit SCSI controller.

Performance differences are just as pronounced. The SuperQuad 4X managed to get beyond dual-speed transfer rates, but dragged so heavily on the CPU that it couldn't decompress video files coming across the interface. The MultiSpin 4Xe external drive glided through our tests.

The SuperQuad 4X is priced only slightly higher than a dual-speed drive. But the MultiSpin 4Xe costs $100 less than its quad-speed cousin, the MultiSpin 4XPro, and performs better. **MATTHEW LAKE**

CD audio controls up front. And finally, the SuperQuad 4X piggybacks off a sound card's Panasonic-compatible CD-ROM connector (or uses a $15 stand-alone interface), while

---

Guide to the Ratings: ★★★★★ *Excellent*   ★★★★ *Good*   ★★★ *Acceptable*   ★★ *Poor*   ★ *Unacceptable*

DON'T ASK ME WHERE I WANT TO

TELL ME WHY I HAVE TO

BE A PROGRAMMER

TO USE THIS

DATABASE.

Visual Recall vs. PageKeeper 2.0

Filing Cabinets of the Future

Document management is as much an art as it is a science, which makes comparing two document-sifting programs a bit like comparing a photograph and a painting—they can show the same thing in very different ways. XSoft's new Visual Recall and Caere's updated PageKeeper 2.0, a pair of capable but contrasting document managers, are no exception.

Visual Recall is a more graphical take on managing documents across a network. Designed for use on NetWare LANs, it typically taps into electronic documents stored on a network server, though you can have it comb through files on local drives as well. And because it comes bundled with a copy of Xerox's TextBridge optical character recognition (OCR) program, it also can convert hard copy into electronic files with the help of a scanner.

Novel Perspective Visual Recall separates the searching process from the retrieved results and makes assembling simple or complex Boolean searches a point-and-click procedure. Its search engine has what XSoft calls "linguistic comprehension," so it can do multilingual searches and find the derivations of keywords—for example, a search for the word *mice* will also find *mouse*.

Visual Recall's Tree and Grid views let you visually browse through sets of documents to better understand their relationships. The Tree view offers a flowchart-style look, while the Grid view supplies a kind of 3-D time line. There's also a conventional list view, and a browser for viewing text and graphics files. Although Visual Recall can't be integrated into other applications, this feature is reportedly coming in Version 2.0.

Inside Look PageKeeper 2.0, on the other hand, *can* be integrated into your applications—and into your communications stream as well. A new feature called PKDirect lets you add PageKeeper options to the Control or File menus of many applications.

The new version of PageKeeper also helps you navigate the information superhighway. It has special import features for files downloaded from America Online, CompuServe, and other major online services.

PageKeeper includes OCR functions based on Caere's OmniPage program, and a powerful search engine that automatically indexes the full text of documents and recognizes similarities by spotting root words. There's also PageKeeper's hallmark, a prioritizing feature called Weighted Relevance Retrieval: Word searches produce a color-coded and startlingly accurate ranking of relevant documents.

However, there's nothing unearthly about PageKeeper's price. At less than $100 on the street, it's one of the best bargains in document management. **CHRIS O'MALLEY**

Picture This: For a new perspective on documents, try Visual Recall's 3-D time line. It shows when files were created and groups them by file type.

Push the Button: PageKeeper 2.0's oversized icon bar takes a one-button approach to importing and sifting through documents.

Visual Recall

USABILITY: *A breeze to install, with an eye-pleasing view of documents.* ★★★★★

TECHNOLOGY: *Several key innovations, but not as chummy with Windows apps as it could be.* ★★★★

VERDICT: *A capable document manager that's short on integration but long on visualization.* ★★★★

PageKeeper 2.0

USABILITY: *Big, clear buttons and many ease-of-use shortcuts.* ★★★★½

TECHNOLOGY: *Impressive retrieval features are now better integrated and tackle online info.* ★★★★★

VERDICT: *The best value in electronic cabinetmaking extends its reach inward and outward.* ★★★★★

FILEBOX

Visual Recall

System Requirements: Windows 3.1 or later, 4MB of RAM (16MB recommended).

Unique Features: Graphic visualization of search results, linguistic comprehension.

OCR Included: TextBridge.

$300 est. street price
XSoft
(800) 428-2995
Reader Service No. 650

PageKeeper 2.0

System Requirements: Windows 3.1 or later, 8MB of RAM (12MB recommended).

Unique Features: Weighted relevance of search results, import capabilities for file downloads.

OCR Included: OmniPage.

$100 est. street price
Caere Corp.
(800) 535-7226
Reader Service No. 651

Guide to the Ratings: ★★★★★ *Excellent*   ★★★★ *Good*   ★★★ *Acceptable*   ★★ *Poor*   ★ *Unacceptable*

On Time and under Budget

SNEAK PREVIEW

Do your projects always seem to require more people, money, and time than you have at your disposal? Primavera's SureTrak Project Manager for Windows can help you keep your large- and small-scale project plans on time and under budget.

Although Primavera advertises SureTrak as the low-end counterpart to its Project Planner, the only low-end thing about SureTrak is its $499 street price. It doesn't include Project Planner's ReportSmith (which lets you design report templates that query users for input), but in most other ways SureTrack is as full-featured as its $4,000 cousin. You can define an unlimited number of activity-related calendars for overtime calculations on a task-by-task basis and develop resource-related calendars that track costs and schedules. SureTrak can even track percent complete and remaining duration as separate items instead of a single, averaged figure.

Low Rent, High Yield
More surprising are SureTrak's ease-of-use innovations. You can drag and drop individual tasks in the Activities column and customize their order instead of accepting the various defaults. SureTrak also provides a Summarizing icon for easy viewing that lets you condense and expand related user-defined activities, along with their dates, costs, and durations. The context-sensitive help isn't a match for Microsoft Project's hand-holding Planning Wizard, but its how-to procedures, concept discussions, diagrams, and embedded explanations make it possible to get intelligible information quickly for any feature.

SureTrak's strongest competition comes from Scitor's $420 Project Scheduler 6 for Windows, Version 1.5 (see "Project Juggling Made Easy," January, page 102). In most respects, the two stack up evenly.

Quick Reports Project Scheduler and SureTrak both let you analyze data from different hierarchical perspectives. Both products also include support for the Open Database Connectivity (ODBC) application program interface, which makes it easy to exchange project data with other ODBC-compatible applications such as relational databases, spreadsheets, and other information resource managers.

The honors for quick-and-customizable report generation split almost down the middle between these two project managers. Project Scheduler supplies 30 preconfigured reports online, as opposed to SureTrak's 20. But SureTrak lets you adjust all project elements—page breaks, graphics placement, timescale density, and so on—from inside the Print Preview mode.

Although the two programs are closely matched in features and price, in the end we'll take SureTrak Project Manager over Project Scheduler. Its approachable interface and easy upgrade path to Project Planner give it the edge. **BARRY BRENESAL**

A. Pull down the Reports menu for access to detailed project reports and instant progress summaries.

B. SureTrak's customizable Views let you track projects from any level or perspective, from step-by-step resource views to broad Gantt chart views.

C. Navigating is a breeze in SureTrak, as is keeping your place. The Dat-o-Meter's date matches the location of your mouse over a Gantt chart.

Project Management, Your Way: Looking to tame the savage project? Primavera's SureTrak Project Manager for Windows can help. Every SureTrak element is reconfigurable, from the available menu selections to the status bar at the bottom of the screen. And SureTrak lets you simplify display elements for new team members and retain the rich assortment of features for activity leaders.

Tools You Can Use: With a smart nod toward usability, SureTrak includes a customizable toolbar. Here you can add commonly used Windows commands as well as SureTrak-specific shortcuts like Spotlight, which highlights and tracks progress on selected activities—handy for large projects and a must at higher video resolutions.

OUR DAY IN HELL BEGAN WITH A HOT CUP OF COFFEE.

DELL LATITUDE XP 100MHz SYSTEM

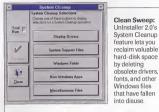Dell's featured computer artist is Jonathan Herbert of NY, NY.

Spring Cleaning for Your Hard Drive

Windows programs are such thoughtless guests. Invite them to your hard drive, and they scatter bits and pieces of themselves like digital droppings in all sorts of directories. They often don't tell you what they're doing, much less ask permission. The result is that when an application has worn out its welcome and you toss most of it out of Windows, various DLLs, drivers, and WIN.INI lines maintain lives of their own. This clutters your directories, takes up valuable disk space, and makes Windows slower to load.

MicroHelp's UnInstaller 2.0 has traveled the road to the best-seller list on the promise of completely deleting Windows programs and all their related fragments. Vertisoft's Remove-It makes the same promise. However, these programs have different features that give them each an edge for separate tasks. What they have in common is that they err on the side of restraint if there's any question about whether other applications may use the files about to be deleted. And that's as it should be.

Safety First Any program that deletes files should not be too easy to use. Until software becomes omniscient, the smart programs will realize their limitations and pass off any tricky question to you. Both UnInstaller and Remove-It do exactly that. The result is that deleting complex applications isn't effortless, but it's safer and still a lot easier than zapping on your own.

The programs both attack unwanted files on several fronts. First, they try to identify all files used by applications in your Windows group and tell you if the files are being used by other

Clean Sweep: UnInstaller 2.0's System Cleanup feature lets you reclaim valuable hard-disk space by deleting obsolete drivers, fonts, and other Windows files that have fallen into disuse.

Ease of Use: Remove-It's feature for zapping fonts shows which fonts appear to be inactive and what each font looks like.

applications. They also try to identify relevant sections in WIN.INI and their Program Manager icons. A viewer then lets you look at a file's header information, which can help you determine whether or not it should get the ax. Both programs make you confirm your decision several times, and as an added precaution you can back up the files to be deleted in a compressed archive.

Picking up Strays UnInstaller and Remove-It also look for files left behind after a manual deletion of an application, but forget about using this feature. In our tests, both programs identified as orphans files that were essential to programs like WordPerfect and Excel. UnInstaller even identified its own DLLs as orphans.

In their primary function, which is ridding your drive of applications and any of their traces, the programs performed similarly—that is, inexactly. While uninstalling Word for Windows, both overlooked related files that Word stuffs into subdirectories.

Because of its handling of INI files, UnInstaller is the better choice for cleaning up a drive that's had a lot of programs crammed onto it over time. But Remove-It has a special feature for the long run: Log-It is a Windows program that keeps records on all the files you install and any changes made to WIN.INI. With these records it can then perform a precise deletion of any application installed on your system.

UnInstaller and Remove-It are useful provided that you remember their limitations. But the Log-It feature in Remove-It means that this is one program we won't delete from our PCs. —RON WHITE

UnInstaller 2.0

USABILITY: *Carefully steps you through the tricky process of deleting outdated support files.* ★★★★

TECHNOLOGY: *Not omniscient, but the INI editor is top-notch.* ★★★

VERDICT: *Useful for clearing a drive that's seen months or years of software installations.* ★★★

Remove-It

USABILITY: *A useful interface that lets you keep a close eye on exactly what you're doing.* ★★★★

TECHNOLOGY: *The Log-It utility should have been part of Windows all along.* ★★★★

VERDICT: *A better choice for the long run. Get it and put Log-It in your Startup group.* ★★★★

FILEBOX

UnInstaller 2.0

System Requirements: Windows 3.1 or later, 4MB of RAM, 3MB of disk space.

Best Features: Good tools for editing INI files, a generous help system that tells you why to do something as well as how to do it.

$45 est. street price
MicroHelp
(800) 922-3383, (404) 516-0899
Reader Service No. 633

Remove-It

System Requirements: DOS 4 or later, Windows 3.1 or later, 386 CPU or higher, 2MB of RAM, 2MB of disk space.

Best Features: Capability to keep a log of file usage and record of changes an installation makes; good interface.

$39 est. street price
Vertisoft Systems
(800) 466-5875, (415) 956-5999
Reader Service No. 634

Guide to the Ratings: ★★★★★ *Excellent* ★★★★ *Good* ★★★ *Acceptable* ★★ *Poor* ★ *Unacceptable*
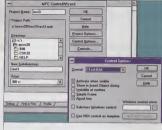
From C++ to Shining C++

Anyone who says that developing applications in C++ is difficult is lying—or hasn't used Microsoft's Visual C++ 2.0. From its elegant integrated development environment right down to its cute little wizards, Visual C++ 2.0 is the answer to every developer's cry for more power and less confusion.

Good-bye Lines The hardest part about programming Windows write the lines and lines (and lines) of code necessary to draw windows, place menus, create toolbars, and so on. Thanks to Visual C++'s AppWizard, you don't have to know very much about that stuff. With just a few mouse clicks, you can create a skeleton on which you hang the code you're really interested in: the code that handles your data.

But don't expect to be able to click your way through the AppWizard to a useful application. If you simply open and run the skeleton it generates, you'll get a nice white screen with a toolbar and some standard menus. With additional clicks, however, you can also add multiple document interface (MDI) support, OLE 2.0 support, and the power to access a number of databases. If you want to distribute your freshly designed application internationally, the AppWizard will take care of that as well: Shipping with Visual C++ are three languages (German, French, and English). All you have to do is add a few more lines of code on top of that, and violà, you have a working application.

What's it like to add those last few lines of code, you ask? In a word, elegant. Visual C++'s integrated development environment (IDE) is one of the best we've seen. It includes

all the extras we've come to expect, like context-sensitive colorization of keywords and drag-and-drop editing. But beneath that veneer lies awesome power. Our favorite feature was the capability to add to procedure and variable definitions and their references by right-clicking on them. That kind of bonus can save a programmer hours—particularly one who is new to a project.

Another productivity boost is in compile times. While Visual C++ isn't the fastest compiler we've seen (Symantec C++ under Windows 3.1 compiled our test applications faster), it's certainly no slouch.

16 Bits or 32? Microsoft doesn't have one compiler that targets both Win32 and Win16 applications. Instead, the CD-ROM that contains Visual C++ 2.0 (the 32-bit targeting

compiler) also contains Visual C++ 1.5 (the 16-bit targeting compiler). Alternately, you can use Visual C++ to generate a Win32s application, which runs under Windows 3.1 (provided you've installed Win32s support) through a process called *thunking*. If you have existing Win16 applications you want to bring into the 32-bit universe, Microsoft supplies the PortTool with Visual C++. This simple utility searches your source code for possible incompatibilities, brings them to your attention, and suggests possible changes.

Visual C++ 2.0 is programming the way it was meant to be: fast, efficient, and powerful. If you've found that Visual Basic isn't up to the challenge, Visual C++ is definitely the next compiler you should consider. **JOHN MONTGOMERY**

The Wiz: Visual C++ 2.0 introduces the ControlWizard, a tool for quickly changing the attributes of controls (for example, buttons and menus) using the Microsoft Foundation Classes 3.0. It sure beats doing the work by hand.

Seeing Is Believing: Visual C++'s online help is superb. You still have to be comfortable with structured programming concepts and object-oriented code to produce professional-looking applications, but Visual C++ goes a long way to making it as painless as possible.

Pixel Formats

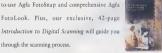*A pixel format specifies several prope surface. Some of the properties speci*

WHAT OUR ENGINEERS HAD IN MIND WHEN WORKING ON OUR NEWEST SCANNER.

*Introducing the
Agfa StudioScan II.*

Push a button, make a scan. Is

it really that simple? With the new Agfa StudioScan II, it can be.

That's because StudioScan II was designed for simple operation. Two levels of scanning software are built in — easy-to-use Agfa FotoSnap and comprehensive Agfa FotoLook. Plus, our exclusive, 42-page *Introduction to Digital Scanning* will guide you through the scanning process.

What's more, every StudioScan II comes complete with Agfa FotoTune color management software and our IT-8 reference target, along with Adobe PhotoShop™ LE and OmniPage Direct™ OCR software. All in a 400 x 800 ppi, 30-bit, one-pass scanner. And all for about $1,000.

So if you want an easy way to bring a scanner into your office, all it takes is the new StudioScan II. And your finger. Call 1-800-685-4271 to find out more information on Agfa's new scanners.

AGFA ◆
The complete picture.

Circle 168 on reader service card.

Painting for Artists and Aesthetes Alike

USABILITY: *Experimentation has never been more fun, but mastering the tools can be tricky.* ★★★½

TECHNOLOGY: *Takes natural-media effects to a new level.* ★★★★★

VERDICT: *A godsend for professional artists and a useful special-effects graphics tool for digital dabblers.* ★★★★½

SNEAK PREVIEW

"Painter 3 lets you have a lot of fun on a PC, even if you don't know what you're doing."

"No way. Painter 3 is a serious, complex tool designed for professional artists."

Hold on, you two. You're both right. Fractal Design Painter 3 is an enticing tool for amateur computer artists *and* a terrific creative tool for design professionals.

As with previous versions, Painter 3 electronically simulates the effects an artist would get using natural media such as brushes and paint to create images. And like Micrografx Picture Publisher, Adobe Photoshop, and other image editors, Painter lets you touch up digital photographs or apply special effects to your images.

Easy Animation New to this version and unique among image editing packages is Painter's features for creating and editing animation (including QuickTime and Video for Windows files). Building on traditional animation techniques, Painter simulates the "onion-skin" method that uses thin sheets of paper so the artist can see through to the previous frame and trace parts of it as the basis for the new frame.

But unless you're an experienced animator, you'll find even tracing images is a chore. Fortunately, Painter extends these animation capabilities so that amateurs can add colors, borders, objects, textures, and other effects to pre-existing animations to create, say, an oil-painted cartoon.

Painter also makes life easier by providing new tools such as the Image Hose, which answers the complaints of the artist who has to draw a scene that, for

A. Spray repetitive designs such as these clover leaves onto an image with the **Image Hose.** A library of images is included on CD-ROM.

B. Painter ships with a host of new **special effects** that you can use to distort images.

C. The **gradient tool** lets you create a wide variety of custom fills.

Something for Everyone: Fractal Design Painter 3 features dozens of image editing effects that will keep the novice entertained and the professional productive. In a matter of minutes, a simple image can easily be transformed into a stunning work of art.

Special Effects: Painter provides infinite ways to customize its tools through icons and drop-down menus, shown here in the dialog boxes for selecting paper textures, colors, brushes, and other tools.

example, contains hundreds of clover leaves. Instead of drawing each leaf, the artist can create a dozen or so representative clovers, then use the Image Hose to spray them onto the artwork. And if you're not enough of an artist to create the initial clover leaves, don't worry. You can sample parts from images already on your hard drive or use any of the hundreds of images supplied on the CD-ROM accompanying the program.

Work of Art Painter's new interface looks friendly and inviting to dabblers, but it can be difficult to master. Much of its complexity comes from an attempt to give you total freedom to control how the program works. For example, you can control the shape of individual hairs in an electronic brush. This gives you an infinite

number of variations in everything from brushes to paper surfaces. Fortunately, you can save your personal favorites to use again and again, or you can select prerolled combinations from the CD.

Painter's interface includes a number of thoughtful touches to help you through its many layers of icons and text menus. One example is the way frequently used icons automatically move to toolbars and stay open while the other icons remain hidden. And you can tear off portions of a dialog box to keep just that part visible after you close the box it came from.

Despite these aids, getting the most out of Painter still takes some practice and experimentation. For the artist or aesthete willing to explore its intricacies, however, the results can be dazzling. **RON WHITE**

Guide to the Ratings: ★★★★★ *Excellent* ★★★★ *Good* ★★★ *Acceptable* ★★ *Poor* ★ *Unacceptable*

An Easy Way to Tally Expenses

The worst part about business travel isn't the long lines for rental cars or the five-hour layover at O'Hare; it's filling out the detailed expense reports when you get back, right? Not if you're using Portable Software's QuickXpense, an easy-to-use utility for preparing, filing, and tracking your corporate expense reports.

QuickXpense ships with 15 standard forms, and for an additional $99 you can purchase XpenseForms to add exact templates for *any* corporate form to QuickXpense. (XpenseForms is free to Fortune 1,000 users and companies that buy three or more copies of QuickXpense.)

Entering receipts in QuickXpense is easy because sorting is automatic and customizable.

| Purpose | Business Trip to San Jose, Costa Rica | |
| Date | 3/25/95 | Project |

Date	Expense Type	Description
	City	Attendees
3/14/95	Airfare	SFO to San Jose, CR
3/14/95	Car Rental	
	San Jose	

Reparation Preparation: Take the make-work and hassles out of expense reports; prepare them electronically with Portable Software's QuickXpense.

Context-sensitive entries are saved in smart lists, so you need only enter information once. You can also break down receipts easily into itemized entries (great for hotel statements) and link items to information in any contact manager.

Need to file that whopping $3,500 expense report in triplicate? E-mail it. QuickXpense supports VIM- and MAPI-compliant mail systems. There's also a useful reconciliation module that lists charges for credit cards. And managers will appreciate QuickXpense's analysis engine for tracking travel and expense spending patterns. **RICH SCHWERIN**

Visual Baler

Build a Better Spreadsheet

Do you really need all of the features in Excel 5.0 or Lotus 1-2-3 5.0 for Windows? If your department has modest spreadsheet requirements, consider developing custom spreadsheets with Baler Software's Visual Baler, a small and efficient compiler for distributing worksheets, royalty-free.

Visual Baler lets you import an existing spreadsheet or create one from scratch. Creating a spreadsheet is as simple as typing text and formulas, then formatting cells and ranges using the right-mouse button. But since the program supports only the WK1 and WK3 formats (Lotus 1-2-3 2.01 and 3.x, respectively), you have to save to that format if your source spreadsheet is Excel,

Bale It: Visual Baler turns spreadsheets into small runtime applications that you can distribute royalty-free.

Quattro Pro, or a newer version of Lotus 1-2-3.

When you're ready to compile a worksheet, select the Bale option to create the runtime version. To further customize the application, you can generate your own help screens (the Microsoft Help Compiler is included) and dialog boxes.

Missing from Visual Baler is support for OLE, ODBC drivers, recordable macros (you have to type macros by hand the old-fashioned 1-2-3 way), and charting capabilities. Baler expects to release an upgrade in the first half of 1995 that will include one of these: charting capabilities. **YAEL LI-RON**

Guide to the Ratings:　　★★★★★ *Excellent*　　★★★★ *Good*　　★★★ *Acceptable*　　★★ *Poor*　　★ *Unacceptable*

THE PREMMIA GX WITH DUAL PROCESSORS.
(This power should be used for good, not evil.)

Just imagine facing the world with, not only one, but two Pentium™ CPUs. You accomplish the most tedious of feats in half the time. Take on multiple tasks all at once. It's like having the strength of two computers.

In fact, some people are amazed at how much the Premmia GX computer performs like a workstation.

Optional dual processors easily let you run the latest 32-bit operating systems.

As for graphics, how speedy is our PCI-based 64-bit subsystem? Over 41 million WinMarks speedy.

Available hard drives include either a 540MB or 1GB Enhanced IDE. You decide.

And with an integrated FastSCSI-2 controller, you can quickly connect a hard drive, scanner or whatever peripherals your work demands.

But, of all its features, the real brawn of the Premmia GX may be our network of resellers across the country. Plus, our very own telephone support group is just a call away–24 hours a day. And, of course, there's a three year warranty as well.*

What else would you expect from one of the industry's largest PC makers?

To learn more about the GX, call 1-800-876-4AST. Knowledge is power, too.

YOU'LL LIKE THE WAY WE WORK™

Premmia GX

90 or 100MHz Pentium processor, OverDrive™ ready

256KB synchronous burst mode cache

PCI and EISA

PCI graphics card, 2MB graphics VRAM upgradable to 4MB

Integrated Ethernet

Plug and Play capable

AST COMPUTER

Don't Hold Your Graphics Hostage

HiJaak, the best-known name in the screen capture business, has moved from the utility room to the suite—HiJaak Graphics Suite, that is.

Inset's HiJaak Graphics Suite combines improved versions of its highly respected HiJaak Pro and HiJaak Browser utilities with three new additions: HiJaak Smuggler, HiJaak Draw, and HiJaak TouchUp.

HiJaak Pro, the screen capture and file conversion utility that anchors the suite, now has a trace function for converting raster (bitmap) images to vector graphics. HiJaak Browser is designed to launch programs and generate thumbnail views. HiJaak Smuggler complements the browser by importing graphics into any application that permits Clipboard pasting.

Thumbs Up: HiJaak Browser serves as a visual file manager for graphics files, letting you view their contents, convert formats, or search for keywords.

HiJaak Draw is a modified version of Gold Disk's Professional Draw.

HiJaak has always been a versatile graphics utility. But the HiJaak Graphics Suite, at less than $100, quite simply offers more graphics bang for the buck than anything else out there. **CHRIS O'MALLEY**

Alpha Five

Point-and-Click Database Design

Alpha Four for DOS, which has enjoyed cult-like popularity, has been revamped for Windows to include tabbed dialog boxes and drag-and-drop design surfaces. Aimed at small businesses, Alpha Five lets companies set up a powerful database without hard-core programmers on hand to help.

In addition to its enhanced usability features, the new version includes support for multiple index (MDX) files. Open a database in several windows (or *sessions*) at the same time, and any change you make to one session is automatically reflected in all the others.

Especially impressive are the data validation tools (called Field Rules). A field defined as a credit card account, for

I Dream of Genie: Need help? Alpha Five's Query Genie walks you through the task. Unfortunately, this is one of only a few Genies in the program.

example, won't accept any values in a format other than the card's number format.

Alpha Five attempts to attract programmers and developers with the addition of the Xbasic language, which looks like Visual Basic with a bit of Xbase thrown in. That's a good start, but it still needs ODBC, VBXs, and OLE 2 support. As of this release, there's also no compiler; a runtime version is due soon. **ROGER W. SAUER**

Guide to the Ratings: ★★★★★ *Excellent*   ★★★★ *Good*   ★★★ *Acceptable*   ★★ *Poor*   ★ *Unacceptable*

RIGHT NOW, THERE ARE HUNDREDS OF VALUE DESKTOPS. BY THE END OF THIS AD, THERE WILL BE ONLY ONE.

LET'S START BY SAYING THAT this is unashamedly an ad for the AST® Bravo MS. And the assumption we're making is that you're currently weighing the implications of moving over to one of the new 32-bit operating systems, like Windows® 95.

On the surface of it, there are hundreds of desktops to choose from.

Obviously, they have to be Plug and Play ready to even be in the running. And, of course, they have to be affordable.

Ideally, they'll have at least a 75MHz Pentium® Processor. And the processor, cache, graphics, system RAM and hard drive will be easily upgradable.

Up to two PCI, five ISA expansion slots, and 7 drive bays are important for enhancement flexibility.

And how about a PCI-based graphics subsystem plus a myriad of advanced power management and security features?

Clearly the Bravo MS has all of this, or we wouldn't be mentioning them.

But there's something else we haven't mentioned: AST NetFlash BIOS. It enables you to update all your Bravo MS desktops from a central location.

AST has it, the others don't. With theirs, you'll have to reconfigure each of the computers on the network individually. And the more you have, the bigger pain it will be.

What more can we say? Except that the Bravo comes in low-profile, mid-size and mini-tower versions. And AST offers 24-hour/7-day telephone support, a 3-year limited warranty• (first year on-site) and comprehensive reseller support in the field.

Talking of resellers, you might want to call us at (800) 876-4AST for the name of the one nearest you.

AST
COMPUTER

YOU'LL LIKE THE WAY WE WORK™

Circle 119 on reader service card.

Avery Ink Jet Labels
White and Clear

Avery Laser Rotary Cards

Avery Ready Index® Dividers

Avery Laser Name Badge Labels and Name Tag Kits

Now appearing on screens everywhere.

Labels:
Avery 5096 3½" Diskette
Avery 5097 5¼" Diskette
Avery 5160 Address
Avery 5161 Address
Avery 5162 Address
Avery 5163 Shipping

Avery LETTER 'N LABEL™
Quality Bond Paper and
Address Label in One

Avery Laser Videotape Labels

Avery Laser Diskette Labels

Avery Full or Mini-Sheets™ Laser Labels
White and Clear

Avery Laser Business Cards

Avery Laser File Folder Labels

Turn on your computer and not only will you find formats for Avery® products you already use — you'll find some you didn't even know existed. Easy-to-use, preset Avery formats are in virtually all major software programs, like Microsoft® Word, WordPerfect® and most database programs. For more information, call **800-462-8379 ext. 822.** And see all the ways to increase your productivity right at your fingertips.

The Products of Office Technology.

AVERY®

A Division of Avery Dennison

NetWare 4.1

An Easy Way to Raise Your Net Worth

USABILITY: *Not quite NT, but far easier to set up and administrate than previous versions of NetWare.* ★★★★
TECHNOLOGY: *Look for others to copy NetWare Directory Services; we'd still like to see automatic hardware detection.* ★★★★½
VERDICT: *Still running NetWare 3.x? Now's the time to upgrade.* ★★★★

How's your network administrator looking these days? Energetic, enthusiastic, eager? Not likely. Novell made big strides with NetWare 4.0, but installation was needlessly tough, the administration tools were a hodgepodge of graphical and character-based utilities, and the client drivers, which were supposed to load into upper memory, flat out didn't work. The good news for your network administrator? NetWare 4.1!

NetWare 4.1 corrects these problems and offers Version 3.x users even more incentive to upgrade: It's priced *exactly* the same as NetWare 3.12 and, with additive licensing, makes increasing the number of users affordable. Add to that a truly automatic setup, a full suite of graphical administration utilities, and Novell's new NetSync utility (which automatically synchronizes all your NetWare 3.x and 4.x servers), and it's easy to see how upgrading to Version 4.1 will pay for itself in no time.

The Big Easy NetWare 4.1 corrects the single-CD installation problem of Version 3.x by supplying the complete documentation on a separate disc. Now it's actually available when you or your network administrator need it most—*during* installation. The irony is that you probably won't need it. NetWare 4.1 automatically sets up a simple flat directory that you can keep or modify as the network grows.

NetWare Directory Services (NDS) is a distributed database of every object on your network that replaces the bindery

A. Navigation shortcuts are everywhere in the new NetWare. The directory tree sits at the top of every NetWare 4.1 system for immediate access.

B. Icons now make it easy to identify printers and users at a glance.

C. To avoid re-entering basic information, create standard templates for users.

D. The NetWare Administrator brings up details about any object within view.

Sick of Syscon? Novell's update of its venerable NetWare operating system lets you manage your entire Novell network from a single screen via the Windows-based NetWare Administrator. You can create, view, and modify servers, users, printers, groups, or any other object simply by dragging and dropping icons. It's a far cry from the cryptic text-based Syscon utility found in Netware 3.x.

Punt PConsole! NetWare 4.1 gives you a quick view of all available printers. To connect to one simply drag and drop the icon for an available printer onto a port icon.

in previous versions of NetWare. Will it save you time and money? Definitely. For example, adding or removing a user on a five-server, three-printer network without NDS means manually entering all the user information on each server. With NDS you simply create the user profile once, then drag and drop it onto the objects for which you want to grant rights.

And since NDS is a distributed database, its power is global and spread over the entire network. Instead of logging on to one server or several servers one at a time, you log on once to the network. And if one server fails, users can still access the remainder of the network. You specify how many

copies of the directory there are and where they're located. Best of all, now you can take advantage of all the benefits the NDS offers without having to build one from scratch.

More Room to Move Novell understands that there never seems to be enough storage space on your server. The company added storage compression to NetWare 4.0 to address this problem, but paid for it with a substantial performance hit. Not so with NetWare 4.1, which improves the compression performance and adds another storage feature, the High Capacity Storage System (HCSS).

HCSS expands your server's capacity by integrating optical

Guide to the Ratings: ★★★★★ *Excellent*   ★★★★ *Good*   ★★★ *Acceptable*   ★★ *Poor*   ★ *Unacceptable*
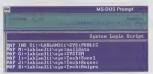
SIDE BY SIDE — EASY UPGRADE: NETWARE 3.x TO NETWARE 4.1

Tedious Entry: With NetWare 3.x, creating a new user account through Syscon meant manually entering details about the users' systems.

Tap, Tap, Tap: Connecting to a network drive with NetWare 3.x required typing hard-to-remember commands in the System Login Script or at the prompt.

Quick Connections: Under NetWare 4.1, all objects—including users and servers—are created with the graphical NetWare Administrator.

No More Memorizing: With NetWare 4.1, connecting to a drive is as easy as moving a file in File Manager. Simply use the NDS to view your servers, then pick the directory you want and drag it onto a drive letter.

---

disks in the form of a jukebox in NetWare. Any files that fall into disuse are automatically moved to the jukebox, which frees up space on the higher-speed hard disk. When those files are requested, they're automatically delivered to users as if they were still on a hard disk.

Integration at Last NetWare 4.0's inability to integrate well with existing networks was one of its biggest liabilities. Now, using NetWare 4.1's new NetSync network loadable module (NLM) utility, you can centrally manage up to twelve 3.x servers. This way you can make changes on one NetWare 4.1 server, and other servers will be automatically updated.

With NetWare 4.1, Novell has also directed its improvement efforts toward workstations. Workstation setup can now be done from a CD on the workstation, or you can create workstation disks from any system with a CD. In addition, the client software is new and features auto-reconnect. Now when you lose your connection to the server, you won't have to reboot. Instead, you'll dynamically reconnect.

Not leaving anyone out, Novell wrote new client software for OS/2 and Macintosh systems that gives them direct access to NetWare 4 servers and all the power of NDS. The company also added support for TCP/IP on workstations, which gives DOS and Windows

clients access to Unix systems.

Load up the new AppleTalk Print Services (ATPS) and Macs can access any printer on the network, whether or not it's running on AppleTalk. Now even PCs on the network can get to those great AppleTalk printers in the art and marketing departments.

The NT Ante Feeling the heat from Microsoft Windows NT 3.5, Novell focused closely on usability improvements with NetWare 4.1. Nevertheless, Windows NT is still by far the easiest network operating system to install, and it supplies a complete collection of drivers. Novell also still can't touch Windows NT's automatic hardware detection,

though NetWare 4.1 gets closer than previous versions.

In the fault-tolerance arena, however, NetWare now goes beyond the disk mirroring found in most network operating systems—it mirrors the entire server. Two servers are connected with standard network adapters and a high-speed mirrored server link (MSL). If a server fails, its mirror automatically takes over with no interruption of service.

Whether you're adding to your existing network or starting from scratch, NetWare 4.1 is powerful and easy to administer. For NetWare 3.x users, Version 4.1 is finally a reason to upgrade and will quickly pay for itself. **ADAM MEYERSON**

Guide to the Ratings: ***** *Excellent* **** *Good* *** *Acceptable* ** *Poor* * *Unacceptable*

Resolve to put Acer systems to work in 1995.

Powerful performance all year long!

AcerPower Pentium/90MHz

AcerPower Pentium workstations give you the high-performance horsepower you need for today's processor-intensive jobs. Business executives choose AcerPower for database analysis and high-level spreadsheet forecasts and analysis. Design and graphic arts professionals swear by Pentium systems for incredible full-color graphics and fast processing, particularly with 3-D modeling. If you can do without long waits, you can't do without an AcerPower!

- Intel Pentium/90MHz Processor
- 16MB System RAM (Expandable to 128MB)
- 256KB Second-Level Cache
- 850MB IDE Fast Hard Disk Drive
- PCI Enhanced Local Bus IDE
- Double-Speed CD-ROM Drive
- 15" .28 noninterlaced Flat Screen Digital SVGA Color Monitor
- 2MB 64-Bit PCI Nitro Windows Accelerator Card
- 1.44MB Diskette Drive
- 2 PCI Expansion Slots
- 4 ISA Expansion Slots
- 1 Combination PCI/ISA Slot
- Microsoft® Windows™ for Workgroups, MS-DOS 6.2, Productivity/ Entertainment Packs, Works for Windows and Quicken®

THE HOME OR OFFICE POWERHOUSE

The AcerPower series of desktop and minitower PCs gives you real computing power at the right price. These out-of-the-box performers leave as much room for future expansion as they leave cash in your 1995 budget. Speaking of which...

AN ACERPOWER TO FIT YOUR BUDGET

The AcerPower line offers a wide range of high-performance minitowers

able to contend with the most power-hungry applications. So as you plan expenditures for the new year, take a close look at basic AcerPower systems that can grow with you. Start off with an AcerPower for as low as $2,495 and still not compromise on RAM, hard drive capacity and performance. Or, opt for a Pentium-powered minitower that crunches numbers for breakfast and multitasks with ease!

MOVE UP TO MULTIMEDIA

Make your AcerPower a family multimedia station with this special

Start the year with multimedia advantage

multimedia upgrade kit. It augments the standard CD-ROM drive with a Sound Blaster™- and Business Audio-compatible 16-bit sound card. Plus, high-performance stereo speakers and a multimedia bundle with Encarta™, Golf, and Math Blaster® In Search of Spot.

The Multifarious Online Message Tool

I have a love-hate relationship with ConnectSoft's E-Mail Connection 2.0. I use it religiously several times a day, seven days a week, because it does what no other application does: It automatically sends and receives my e-mail from CompuServe, America Online, and MCI; it lets me read and respond to messages offline in a Windows interface; and it keeps one database of all my e-mail addresses so I never have to mess with finicky e-mail strings. That makes it worthy of my love

But there's the hate part, too: E-Mail Connection is a quirky program that doesn't remember the maximized position and size of the tool windows in its InBox, OutBox, and Address Book; it doesn't automatically resize windows if you resize

the program window; and the keyboard shortcuts aren't well thought out. In the Address Book, for example, you can type letters to automatically search for a name, but once you find it, you can't just press Enter to choose the name. Similarly, the InBox shows a graphical tree called the Target Folder List that lets you choose which user-archive folder to file previously read messages in, but you can't double-click on one of these folders to open it.

In addition, I encountered a glitch in E-Mail Connection when I tried editing messages: The program started dialing out on its own, even when the autodial feature was disabled. At first I thought I had hit the wrong button by mistake, but it turned out to be a recurring problem.

I use E-Mail Connection 2.0 because there's nothing else like it. I need one way to retrieve, reply to, and sort messages from all of my online services, but its usability flaws and some highly unusual transmission quirks make me pine for something better. I'm keeping my eye on any competitor that comes close. **SCOT FINNIE**

E-Mail Connection 2.0 / ConnectSoft /
(800) 234-9497 / $50 est. street price /
Reader Service No. 642

Keyboard Therapy

Giving up the Kinesis Ergonomic Keyboard for just one day (when it had to be photographed) was one of the hardest things I've done lately. Of course, the first few days I used it I wished I hadn't offered to review it. But it grew on me.
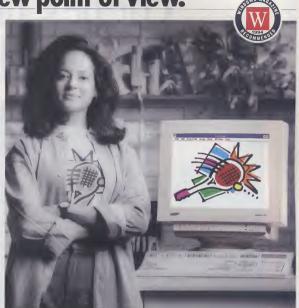
The placement of many keys, including Backspace and Enter, initially made no sense although the keyboard uses the QWERTY layout. But the more I typed, the more efficient my typing became as my

fingers naturally fell to those traditionally hard-to-reach keys such as V, B, and T. This keyboard is designed for touch typists, and I've already reaped the payoffs. I just had to get past that initial stage of discomfort to unlearn my unergonomic behavior.

A couple of things have never quite felt comfortable, though. As an avid Windows user, the placement of the Ctrl and Alt keys has never felt right. Similarly, the placement of the arrow keys makes it difficult to use the keyboard to select text, and so I use my mouse more often. The lack of a numeric keypad is another drawback.

Now whenever I use a traditional keyboard, my hands feel cramped, my fingers contort to hit some keys, and I make more mistakes because my fingers don't fall naturally on the keys. In other words, I'm a Kinesis convert. **KYLA K. CARLSON**

Kinesis Ergonomic Keyboard / Kinesis /
(800) 454-6374 / $390 est. street price /
Reader Service No. 643

There's fast.
there's Parallel

3Com®

INSERT
◀◼◼◼
THIS SIDE UP

3C589

Ethe
Parallel
PCMCIA

For 10BASE
and Coax

And then
Tasking fast.

Want to get your notebook computer connected to the network in a hurry? You need a notebook adapter card that's fast. Parallel Tasking® fast. The new EtherLink® III PCMCIA network card from 3Com is up to 110 percent faster than any other Ethernet notebook adapter you can buy.

Built with the Parallel Tasking technology that more than eight million users have already adopted, this PCMCIA card is compatible with every leading notebook computer. Guaranteed. Or your money back.

And it doesn't stop there. Because 3Com's EtherLink III is not only fast. It's easy to use.

In one easy step, the EtherLink III PCMCIA card can be installed and working. It'll take less than three minutes. With a single menu selection you can configure the adapter and even install the NetWare® client files.

On top of that, the EtherLink III PCMCIA card includes Card Services support, including "Hot Swap" capabilities. A 3Com card can be swapped in the middle of network activities, without losing its network connection — even into a different PCMCIA slot. No other PCMCIA card is as easy.

And like all 3Com® adapters, EtherLink III PCMCIA comes with a lifetime warranty.

So what are you waiting for? For only $99* you can try it for yourself. There's no faster or easier way to get your notebook networking at top speed. To receive your evaluation card, call **1-800-NET-3Com**.

3Com®

Circle 164 on reader service card.

When all else fails,

There are three types of computer users: those who have lost data due to a power problem, those who are going to, and those who have protected themselves against the inevitable surge, blackout or brownout with the most reliable UPS they can buy: Back-UPS by APC. In fact, editors and users alike agree that if your system demands absolute reliability, you can depend on APC Back-UPS.

According to a study by Bell Labs, undervoltages represent the overwhelming majority of power problems likely to hit your computer. The question is not if a failure will occur, but when. Whether due to construction, wiring, weather, other office equipment, or accidents, power problems are as inevitable as death and taxes. That's why you need instantaneous battery backup power from the Back-UPS to prevent data loss, hard disk crashes, and hardware damage.

If you're concerned about lightning, rest assured that when measured using the ANSI/IEEE 587 Category A test wave, Back-UPS are superior to virtually all separate surge suppressors. Surge performance is even backed by a \$25,000 Lifetime Equipment Protection Guarantee.

© 1994, APC. Back-UPS, PowerChute are trademarks of APC. Other trademarks are the property of their owners. Specs subject to change without notice.

Back-UPS prevail

"All other brands of UPS die regularly in this lightning prone environment. My APC won't die!" said Paul Sisilli, Systems Analyst, City of Port St. Lucie. "With other brands, users don't find out until it is too late. The power interruptions here are very hard to live with. The other brands are dying off. Typically they last just beyond their warranty period. My Back-UPS is going on three years...no other brand is as reliable."

Don Truax knows first hand about Back-UPS reliability: "It ought to be against the law to buy a computer without an APC Back-UPS 250. I recently had a direct lightning hit right outside the house...my computer never blinked. Each morning I get a surge down the line and both APC's hate it - they simultaneously 'holler 'n clamp' while my 'Brand T' quietly sleeps in. I've relegated that unit to non-critical household stuff like my VCR."

Andrew Wargo, Manager at Baxter Land Company, tried two other brands before Back-UPS. "One lasted a few days, a second one went up in smoke after 48 hours, a third lasted less than 24 hours! I then bought my Back-UPS for less than half of what I had paid for the others. We've purchased three more Back-UPS and for the past 14 months they've been just hummin' away on the same power line that was eating the other brands alive!"

If you're protecting a network server, a communications interface port (on models Back-UPS 400 and higher) provides the security of an automatic shutdown to all major OS including NetWare, Windows, Windows NT, LAN Server, LAN Manager, LANtastic, SCO Unix, OS/2, Banyan Vines, AppleShare/System7 and more, so your data is safe whether the system is attended or not. (PowerChute software and interface kits sold separately.)

And since data processed on networked clients needs protection too, the $139 Back-UPS 280 provides an economical solution for all your LAN workstations. And if you have a new green PC, the price is even better at $119 for the new Back-UPS 200.

MADE IN 🇺🇸

Discovering how essential Back-UPS protection is

More than... 2,000,000 Satisfied Users

APC has won more awards for performance and reliability than all other UPS vendors combined...including five consecutive LAN Times Readers Choice awards...

PC World Top 20 Upgrade
Windows Mag Readers Choice
LAN TIMES READERS CHOICE 1994
ReaderNews Editor's Choice

can be hard...if you wait for the next storm to roll through. But discovering how affordable it has become is easy...

Call today and find out (the easy way) why more than 2,000,000 satisfied users bank on Back-UPS from APC. With more awards than all other brands combined, field-proven reliability, and a two year warranty, Back-UPS are power protection you can purchase with confidence.

AWARD-WINNING FEATURES

Instantaneous backup power beats blackouts and brownouts

Unmatched lightning (tested to UL1449) and surge protection for maximum hardware safety

Network-grade line conditioning and EMI/RFI filters prevent glitches

LAN Interface (on Back-UPS 400 and up) provides automatic shutdown to all major OS: Windows, NT, NetWare, LAN Server, LAN Manager, LANtastic,Unix, OS/2, Vines, AppleShare/System7 and more.

Site diagnostics automatically spot missing ground and reversed polarity, two common miswirings which usually require an electrician's visit to diagnose.

Option switches allow you to customize transfer voltage and alarm settings.

Test Switch for ongoing peace of mind.

2 year warranty and full safety approvals including ISO9001.

$25,000 Lifetime Equipment Protection

Hot Swappable User Replaceable Batteries reduce service time, costs by allowing safe removal and replacement of exhausted batteries, while your system stays running.

Back-UPS (L to R)	Application	Sugg. List
200	Green PCs, small desktop systems	$119
280	Desktop systems, LAN nodes, POS	$139
400	Desktop 486, 386 systems, servers	$199
450	Tower 486, 386 systems, servers	$254
600	Heavily configured systems, CAD/CAM workstations	$359
900	Multiple systems, longer runtime applications	$529
1250	Multiple systems, LAN hubs, small mnns, telecom equipment	$689

For Gov/GSA Sales, Call 1-800-788-5414

PowerFax Info (800)347-FAXX Get specs faxed directly to your desk!

APC
AMERICAN POWER CONVERSION
800-800-4APC

APC EUROPE (+33) 64621900 / ASIA/PACIFIC FAX, (+813) 5295-1989
L. AMERICA FAX: 401-789-9771 / Compuserve: GO ASUPPORT
Internet: tech@apctech.UUCP or sunet@apctech.techo

Dept. E7

Circle 116 on reader service card.

COVER STORY

Find It &

Y ou already know the importance of connecting. You connect everyday with clients, associates, employees . . . even lawyers. But making business connections in the '90s is more than this. To make the most of every resource, sooner or later you'll be hooking up to a remote computer and trawling the online world.

The hugely popular America Online, Compu-Serve, and Prodigy, and the phenomenal Internet (which these services can now access), are more than just reference libraries. For businesses, they can all be valuable in the search for information, people, and ways to do business.

The challenge lies in finding the service that can deliver the kind of information your business needs. Do you turn to the immense but chaotic Internet or to the more organized and accessible commercial services? Which can best satisfy your needs with fast, up-to-date intelligence? How do they compare in cost? Which is populated by the people you need to make your business thrive?

And which is the best to choose if you're trying to sell your products or services online?

The Great Quest We scoured America Online, CompuServe, Prodigy, and the Internet to help you answer these questions. Basically, we wanted to know three things: the quality and quantity of information available, the cost and efficiency of accessing and retrieving it, and the likelihood that the material would be able to meet your needs.

First we looked at how quickly and conveniently you can find information—financial data, details about trends, and information about specific industries. Then we explored the possibilities

SUPPORT NET: Hewlett-Packard's SupportLine Services shows how creative companies can provide strong customer service on the World Wide Web. Click on buttons to read support news, retrieve software patches, and search a database for product information.

A QUICK WAY TO GET RICH: CompuServe's Finance area is a wellspring of worthwhile services. Here's just such a service, QuickWay's company analyzer. But before you jump in, check the early warning signs: dollar signs after some of the items tell you that accessing them costs extra.

Do It Online

of using online services as a forum for conducting business—finding potential employees, marketing and advertising, and selling and supporting your products and services. And as a litmus test, we sent our online experts on a "scavenger hunt" to ferret out solutions to 20 typical business questions as quickly, easily, and inexpensively as possible (see pages 115 and 125).

How inexpensively? There's the rub. Each service has monthly costs, but only with the Internet does one price get you on almost every ride. For the three commercial services, the monthly charge covers a specific number of data sources and many of the more desirable services cost extra.

Net Costs A typical Internet account through a 14.4Kbps modem will run you between $28 and $45 a month, depending on the price of your service provider. The price includes a specified number of online hours, normally from 20 to 50, and you're charged between 50 cents and $2 for each hour thereafter. Very rarely, however, are you charged for accessing an individual area unless it requires you to establish a separate account with

them. Within your allotted time, you have access to everything the Internet has to offer. And if you use the Net a lot, your service provider will almost certainly offer an unlimited-use option, but you'll need to use it a lot to make it pay—the charges are usually between $250 and $300 a month.

Things change with the commercial services. Monthly rates are much lower, with America Online clocking in at $9.95, Prodigy at $14.95 for its Value Pack service, and CompuServe at $8.95 for its basic plan (the Executive option is $10 extra). But it doesn't stop there. Many forums in CompuServe cost extra, and while America Online and Prodigy are kinder in this regard, all three services offer databases and forums that cost over and above the standard monthly connect charge. And several of the most important business and reference databases charge by the search or retrieval. That monthly $8.95 can easily balloon to $100 and beyond.

Online Surfers Along with access to data, one of the big attractions of these services is the people you find. You also have access to millions of users across a

wide demographic spectrum. The trick is knowing where to find the people and resources you need most.

Read Me There's no substitute for spending time on the forums yourself to make the right contacts and find pertinent information. But if you know what you're looking for and don't have time to burn, the six sections that follow offer starting places.

Divided into two parts, this feature starts out by showing how to find useful business information online: financial overviews and specifics, market trends that may affect your business or provide new opportunities, and ways to keep track of the industry of your choice across the wires. The second portion focuses on how to do real work online: hiring people, marketing or advertising your business, and doing business by modem. Check out the "Top Six Sites" lists in each section. These offer a quick list of places you'll want to go soon. If you're surfing this feature like you surf the Net, they're the first wave you'll want to catch.

BY NEIL RANDALL

EVERYBODY GET ONLINE: America Online's opening pages illustrate this fast-growing service's emphasis on usability. Three quick clicks take you to relevant, specific articles with a business perspective—and also provide quick links to major business newspapers and related Internet Gophers.

NOT JUST FOR FAMILIES ANYMORE: Prodigy's Business/Finance page typifies the service's high degree of usability—developed from its home-use origins. Access each numbered item or button with a single click. Hint: The Financial bulletin boards area is a good place to start.

Find It Right Now

Online services lend new meaning to a tired expression: Online, time really is money. You don't have time to log on to a service and conduct all the searches you'd like. And nobody in their right mind would spend more money than the information is actually worth. Here we compare the online services for finding information about money, trends, and specific industries. What's available? How do you find it? Is it worth the price? You have to have answers to these questions, because you have to be able to justify the time and energy expended.

   We ferreted out the really useful information about finance, business trends, and industry-specific developments from each of the three commercial services and the Internet. Then we pitted the services against each to discover which service is best for you.

Money Matters

The minute you entered the money arena, one thing became clear: You need detailed financial updates constantly. So you developed the usual routine: devour the business section of the morning paper, follow money issues at every possible opportunity during the day, and channel-surf at night to the stock information channel on your cable service.

   That's the old-fashioned way. While there's no

Cash for Service: QuoteCom is one of World Wide Web's few extra-charge services. The empty buttons hint at growth to come.

substitute for the business section over that first cup of coffee, once you join an online service, continual updates are yours for the asking. Almost anything you could want to know can be found on any of the services. All you have to do is decide which is best.

   The Internet Locating financial updates demonstrates both the Net's greatest strength (wide-ranging information at no additional cost) and its greatest weakness (disorganization and search inefficiency). You can find this information at several sites on the Net, but the best way to start is to access a subject listing until you grow familiar with what else is available. There are several of these out there, but one of the best is known simply as Yahoo, located on the World Wide Web at http://akebono.stanford.edu/yahoo/Economy/Markets_and_Investments/.

   From here you have several links to mutual funds and stock information. Under the Mutual Funds heading are mutual fund charts from MIT, the Nest Egg Mutual Fund Information Center, and the Security APL Quote Server, with its extremely attractive offer of unlimited free quotes. This service also provides specific links to Invesco Funds, Janus Funds, and Kaufmann Mutual Funds.

   Recently, a new quote site has appeared on the Web. QuoteCom, located at http://www.quote.com/

quot.html, provides a full series of up-to-the-minute quotes and a tiered registration system. You register for the free service, which entitles you to five free quotes per day. Basic service, the next level up, costs $9.95 per month (cheaper by site license) and opens your options considerably, including 100 quotes per day. You also get BusinessWire and PR Newswire subscriptions as a bonus incentive for this amount.

If you're not equipped for the World Wide Web, don't despair. Stock market information is everywhere for the asking. Just use a Gopher to get to wuecon.wustl.edu and enter the richly detailed Holt Reports directory. Also available from this Gopher is Huang's Weekly Futures Market Report. There's no question, however, that the Web provides the easiest access to financial information, so even if you lack a graphical browser, you owe it to yourself to access it.

America Online A wide range of sources for financial information is available on America Online, but it's stronger as a general business source. Still, there's plenty to get engrossed in if you're a money-watcher. The American Association of Individual Investors offers a full online service, complete with information about retirement planning, mutual funds, and portfolio management. Decision Point Timing and Charts offers up-to-date stock and mutual fund charts. A service called Top Advisors' Corner features newsletter-type advice from professional money people. The Investor's Business Daily features everything from details about the economy to substantial information on markets and investments.

Into mutual funds? Then you'll want to spend considerable time in the Morningstar Mutual Fund area, which includes information about international stocks and funds as well as those in the United States. The Quotes and Portfolios section lets you search for stocks by name or symbol,

American Investments: We found AOL's Quotes & Portfolios the most usable online resource for finding company information.

CompuServe Information: FundWatch Online searches for fund performance based on a wide range of user preferences.

while Your Money magazine keeps you up-to-date on your financial status and offers links to other financial planning resources. Finally, Market News lists closing averages, most-active and largest-changing information, international markets, and commodities for the current day.

CompuServe By virtue of the sheer volume of monetary numbers available, CompuServe outweighs everything else available. As a starting point, type Go Finance. But be prepared for the inevitable: Many of the best sources incur additional fees, and although they're relatively inexpensive for one-time searches, the price can be exorbitant if you use them daily to obtain quotes. Current Quotes, for example, offers an extremely fast and useful service, but it surcharges your CompuServe account 1.5 cents per quote. Hardly a catastrophe, but if you want 100 quotes per day, you're up to $45 per month—about the same as you'd pay for the World Wide Web's Quote-Com, which offers plenty of worthwhile extras. Another example is the News-A-Tron Market Reports, which charges you a $1.25 flat fee for as much information in one sitting as you can garner. None of these services costs much individually, but put them all together and you can work up a whopping bill in no time.

Still, CompuServe's non-surcharged services can be immensely useful. Basic stock quotes are there for the asking, as is access to FundWatch Online by *Money* magazine. FundWatch Online lets you check your existing or considered funds according to eight investment objectives (such as aggressive growth), then displays the results in one of seven ways (including ten-year annualized). Not until you enter the Extended Products section of the Finance area, however, does the full value of CompuServe's offerings come through. Current Quotes, Current Market Snapshot, and information about commodity

Money Matters

The Top Six Sites

1 Check out Economy: Markets and Investments (http://akebono.stanford.edu/yahoo/Economy/Markets_and_Investments/).

2 The Security APL Quote Server (http://www.secapl.com/cgi-bin/qs) on the World Wide Web features a continually updated Dow Jones Industrial Average and unlimited free quotes.

3 The Top Advisors Corner (keyword: Advisor) on America Online has information and advice from experts.

4 America Online's Morningstar Mutual Funds area (keyword: Morningstar) gives you news and information about mutual fund behavior, and even a "lounge" where you can discuss mutual funds.

5 The Personal Finance forum in CompuServe (Go Finance) gives you access to a range of publications and tools to keep track of money matters.

6 Prodigy's CNBC-Markets area (Jump CNBC) features information about markets and a direct link to the CNBC bulletin board for discussion.

markets are all easily accessible (with surcharges), and the VESTOR buy-sell recommendations service is also here, albeit with an additional $45-per-hour charge. To shave every spare second off these high rates, use CompuServe's Navigator or another software package that logs on and checks quotes efficiently.

Prodigy The jumping-off point in Prodigy is the Business and Finance area (Jump Finance). This section still hasn't reached a critical mass, mainly because of Prodigy's beginnings as an easy-to-use family-oriented service. Still, there's a considerable amount to go on here, including an area for quotes, markets, and online trading and banking.

The Quotes button takes you to a usable system for extracting current market quotes. It also lets you track historical data through charts at 50 cents per chart or less for Strategic Investor subscribers—a special feature that costs $14.95 per month for unlimited use. The Quote Check area includes company news, and if you find companies you

want to track, you can add them to one of a number of customizable "tracks." There are also several worthwhile bulletin boards for discussing money issues, including the Money Talk bulletin board accessible through the Business and Finance area.

The Finance area also gives you access to the CNBC Market Update—a great resource for a brief glance at the American Stock Exchange, NASDAQ, bonds, mutual funds, and world markets. Prodigy's discussion forums also provide a service here, especially if you want opinions on certain investment types.

As usual with Prodigy, information is presented concisely and readably, but you'll find yourself wishing for more. Keep in mind that Prodigy was originally designed for people to use in the home rather than as part of their business. This family-oriented, casual-use background goes a long way toward explaining its quick-and-digestible nature. If all you really need is broad overviews, this is the *USA Today* of online services—just the service to get bite-sized nuggets from.

Trend Spotting

Knowing how your current investments are doing isn't enough. You also need information on what will happen in the future. The secret is spotting trends, and for that you need expert help.

The good news is that you can get that help online. The bad news is that it doesn't appear in a consistent format and it's not always the kind of help you need. Generally speaking, the Internet is the most useful source for gathering news and

Prodigious Market: Take a quick look at the day's world markets and more from Prodigy's CNBC Market Update service.

tracking economic indicators. The three commercial services focus much more closely on individual financial considerations.

Of course, money trends are only one weapon in your business planning arsenal. Demographic information is also crucial, and it's available in profusion online, especially via CompuServe and the Internet. For concise, easy-to-find information, the commercial services have a distinct advantage. But international coverage is the Internet's strong suit: Try the demographics Gophers in North America, Europe, Australia, and the Pacific Rim.

No matter what service you use, don't ignore the news sources. All of them post business news as soon as it's available, from newspapers and magazines such as the *New York Times* to *The Economist.* Even if you do nothing except keep up with the current articles, you'll stay on top of financial and market trends.

The Internet If you're going after global economic trends, the Net is the place to go. This is understandable considering its history as an academic/research system, but the result is that the Net is less immediately helpful than the commercial services if you're following your personal portfolio rather than the Great Keynesian Debate. And the World Wide Web is quickly becoming

Economic Safety Net: The Internet's Economic Bulletin Board shows trends in trade, employment, income, and more.

the best place to be, but Gopher and Telnet can still get you to rich sources of information.

The best spot on the Net for economic and commercial trends is the Economic Bulletin Board at the University of Michigan (Gopher to una.hh.lib.umich.edu or telnet to ebb.stat-usa.gov and log in as guest). From here you have access to a huge range of economic indicators, which makes it easy to pick out the trends you wish to follow. This service provides specific industry information alongside historical archives of economic data—a killer combination for trade issues.

One of the Net's more useful sources for economic trends is the Gopher based in the Netherlands and located at zeus.nijenrode.nl (the path to follow is Business, then Statistics, Americas, North, USA). From here you can tap a vein of U.S. census data, labor statistics, U.S. Department of Commerce information, and other wellsprings of economics and demographics. This is also the Gopher you'll want for research if you're doing business internationally.

The trick to finding demographic and financial trends via Gopher is using meta-lists. Of particular importance is Gopher-Jewels, found by gophering to cwis.usc.edu. Here you'll find links to financial research, demographic Gophers, economic information, and practically any other subject under the sun. Search here and plant bookmarks so you can come back often.

If you prefer to do your searching on the World Wide Web, one of your best stops is the newsletters subpage of the Yahoo directory, which is at the end of this massive address: http://akebono.stanford.edu/yahoo/Business/Corporations/Financial_Services/Investment_Services/Newsletters/.

Yahoo's newsletter packs a variety of investment and trends-based information, including the Sector Fund Newsletter, ProfitMaster (with its

useful forecasts of stocks), the Mutual Fund Forecaster, and more. And if you're the kind to take advice from experts, brokerage firms offer recommendations here with frequent updates.

America Online To examine trends on America Online, swing immediately into Decision Point Timing & Charts. Here you'll find daily trends-related charts in the form of graphics interchange format (GIF) graphics files for download. (If you don't have a graphics program with GIF support, the site offers one for download.) The charts include Dow Jones Industrial, Transportation, and Utility averages over the past three years, Popular Market averages; a three-year daily chart of the McClennan Oscillator; and charts for gold, oil, Treasury bills, and dollar values. And then there are magazines: Worth Online features the investment tips and fascinating reading on the world of finance that you've come to expect from its paper version. Consumer Reports looks at trends of a different sort—useful for details about specific products.

Among the more useful trend-spotting areas on America Online is the Investor's Business Daily. Here the Economy area features a host of worthwhile articles, many of them dealing with specific monetary trends, including inflation, trade, and international discussions. Also extremely valuable is the Economic Indicators section from this area. It has indicators for factory orders, farm prices, industrial production, and many more. And you can spot trends within the Business News section of America Online, especially in the frequently updated Top Business news features.

CompuServe You don't always have to pay a surcharge to track the latest trends on CompuServe, but it helps if you're prepared to. In order to get a good general sense of what's going on, visit the Business Almanac through the main Finance area. Much of this material is presented in the form of standard downloadable tables, but the

News Online: The Investor's Business Daily links up-to-date investment and economic news to other valuable trend-oriented data.

Trend Spotting

The Top Six Sites

1 The Economic Bulletin Board (una.hh.lib.umich.edu) is a Gopher or Telnet area full of financial and economic data.

2 Dutch Gopher zeus.nijenrode.nl is a superb collection of European financial information. It's also strong on other areas, including the Americas.

3 Investor's Business Daily on America Online (keyword: ibd) links you to a wide range of monetary and market trends. Start with the Economy button.

4 The charts and tables on America Online's Decision Point (keyword: DP) track financial trends and provide links to further research and discussion boards. And if you're a little shaky on stock chart analysis, take the online course.

5 CompuServe's Earnings and Economics Projections (Go Earnings) gives you census data and links to international financial reports, Standard & Poor's full online service, and InvesText.

6 Prodigy's Business and Finance (Jump Finance) features retail sales and employment statistics, and more.

Industry Watch

The Top Six Sites

1 The Securities and Exchange Commission EDGAR filings at gopher-.town.hall.org can direct information from a huge range of companies your way.

2 ClariNet newsgroups (see http://www.clarinet.com /index.html for details) offer a constant stream of industry-related news and discussions.

3 Don't miss the Government and Business area in America Online's Business News.

4 Access and download company reports from all manner of industries using a premium service, InvesText (Go Invtext), from CompuServe.

5 Hoover's Company Database in CompuServe (Go Hoover) features extended profiles of more than 1,000 of the most influential companies in the world. Among the details: executive names and corporate strategies.

6 Dun & Bradstreet Solutions on Prodigy (Go D&B) offers information about specific companies and industries. You can search the database by type of industry.

range of information these tables yield is outstanding. On offer here are Dow Jones Averages, Standard & Poor's 500, the Russell 2000 Index, and details on bonds, futures, and individual and institutional investments.

From the Professional area, you can access two useful sections: Business Management and Entrepreneurial/Small Business. These offer links to useful discussion forums as well as Demographics and Government Information, another important trends consideration. The amount of useful demographic material varies across the topics, but because you can scarcely track potential markets without demographic research, you'll immediately find these figures worthwhile.

From the main Finance area you can also get to Earnings/Economic Projections, which leads you to Census data, the Money Market Services' International Financial Reports, and the Institutional Brokers Estimate Survey. These have extremely useful material, but it comes at $2 per report. And while you're online, don't forget the Financial and Professional forums, where you can discuss trends

and other issues with experts and would-be experts. Check out the Investors' Forum for a sense of what to expect here.

Prodigy Spotting monetary trends through Prodigy is easy, although like diet food its great taste doesn't mask the fact that it's less filling. The Research button in the Business and Finance menu leads to several worthwhile trends-related screens, including one devoted specifically to economic indicators. You can access indicator statistics here for unemployment, factory orders, home sales and costs, retail sales, the trade deficit, and more. These indicators are presented clearly with some precise detail, and the accompanying text explains the issues further.

The CNBC Market area of Finance offers good charts and statistics, including quick-look charts that show the recent behavior of gold, Treasury bills, and the U.S. dollar. Pay particular attention to bond and futures activity: These are useful for spotting recent trends and acting on them. There are other methods of tracking trends on Prodigy, but these are the most significant.

Hives of Industry

You're already part of an industry. Where do you find instant and continual information about it and other industries you deal with? Newsletters, daily fax reports, and trade papers are your primary sources. But online you'll find excellent summaries of recent events in many different industries.

And where industrywide analysis is lacking, details about specific companies pick up the slack. The Internet is particularly strong in this regard, as companies are vying to establish a strong presence to promote their offerings.

The Internet Industry information is everywhere on the World Wide Web. But whatever you do, don't pass over Michigan's Economic Bulletin Board (Gopher to una.hh.lib.umich.edu). This Gopher links you to industry statistics, Industrial Sector Analysis reports, and International Market Insight reports. Furthermore, Best Market Reports offers extended commentary and statistics on specific industries. Gophering to gopher.town.hall.org will put you in touch with the Securities and Exchange Commission's EDGAR filings, including daily and full index files.

To get an idea of how to track one industry in particular, check the high-tech industry at http://www.industry.net/. This well-developed site puts

you in touch with many aspects of the computer industry, including an archive of information and a free subscription to an industry report.

By far the most active and interesting industry information on the Net comes through the ClariNet newsgroups, which cost additional monthly fees (determined by the service provider). You can subscribe by yourself for the standard rate of

WWW IndustryNet: This Web site is a prime location for computer industry news, with links to industrial bulletin boards.

It hit *us* over lunch.

If *we* could order

the combo,

maybe

we could

offer one.

$40 per month, but institutional/network fees are probably more sensible. See http://www.clarinet.com/index.html for additional information.

ClariNet newsgroups are professionally based, and if you need constantly updated details about industries and companies, ClariNet provides them. Some newsgroups deluge you, but when you really need to keep on top of things, a deluge is better than a drought.

America Online First stop: Business News. Updated frequently, this area lists nearly 30 separate directories, beginning with articles about the U.S. government, company actions, and company finance and ending with each major industry individually. Construction & Building, for example, offers articles on domestic and international construction issues. Other industries covered include media, retail, technology, telecommunications, transportation, and utilities. The articles feature trends, projections, and current issues involving the industries, and they offer a fast way to keep up with the latest news.

Next stop: The International Corporate forum is designed to bring together companies and investors. It offers conference information for major industries. You can even post questions to participating CEOs. Company details are also available from the Professionals forums, but not usually as a separate menu item.

CompuServe For instant gratification, try CompuServe's InvesText through the Earning/Economic Projections menu—but be prepared to pay. InvesText's full company and industry reports (as compiled by Wall Street firms) start at $20 for ten report title searches and $20 each for an additional ten. Once you retrieve a report title, you'll pay $15 a page.

Prodigy Prodigy is less useful than the other services on industry details, but it makes up for this to some degree with its extensive company data. Several resources are available from the Business and Finance area through the For Business button, including Dun & Bradstreet Solutions. A well-designed tutorial shows you how to conduct company searches, which can be based around industry criteria or focus on individual companies. As might be expected, these reports cost money: The first full report is $5, with a sliding scale to $1.50 per report for more than 100.

The strongest industry-related area on Prodigy is Dow Jones Company News. From here you can access an area called Industry News, which gives you article after article from 14 categories. You can choose between headlines or full articles. A quick scan of the technology category on one particular day showed eight subcategories with stories dated as recently as the previous day. Another plus: The articles cost nothing extra.

DECISION MAKER — BEST BETS FOR FINDING INFORMATION ONLINE

1 Choose the factor that's most important to you. **2** Choose the next most important factor. **3** What else is important? **4** For your needs, the best service to use is . . .

Category	Factor	Sub-factor	Best Service
Money Matters	Cost	Avoiding Hidden Costs	Internet
		Low Startup Cost	America Online
	Data Sources	Variety of Sources	Internet
		Portfolio Advice	CompuServe
Trend Spotting	Cost	Search Usability	America Online
		Avoiding Hidden Costs	Internet
	Data Sources	Variety of Sources	America Online
		Ease of Follow-Up	CompuServe
Industry Watching	Cost	Ease of Locating Information	America Online
		Ease of Follow-Up	CompuServe
	Data Sources	Variety of Sources	Internet
		Usefulness of Sources	Internet

Do Business Online

Getting information online is one thing; running your business is quite another. For an online service to justify the added expense, it has to help you with your personnel, marketing, and sales needs. If you're satisfied with the way things are right now, you'll be better off not going online. Then again, when was the last time you were completely satisfied with your personnel, marketing, and sales? It just doesn't work that way, does it?

   Doing business online takes resources, planning, and effort. It also takes commitment and, in the case of the Internet at least, a fair dollop of pioneering spirit. Online business is not just a venture but an adventure, and unless you're willing to treat it as such you might be better off waiting until all is tried and certain. But then, that's not the way you do things if you want to get ahead in business.

Human Resources

No matter how strong your current blend of personnel, you're always on the lookout for one or two perfect people to add to the mix. Traditionally, the way to find these people was by advertising in newspapers, recruiting from colleges and other institutions, even hiring a headhunter. All of this costs money, sometimes lots of it, so why not add another mechanism to your recruiting procedure that's perhaps just as focused and effective?

   Millions of people use online services, and many of

Resumes Online: Sift through job seekers with smart searches of Talent Bank in America Online's Career Center.

these people are intelligent, educated, and experienced in your field. If you know where to look, drawing up a short list online is often easier, faster, and more complete than through traditional sources. There's a growing number of online employment resources to choose from, and it's even possible to acquaint yourself with prospective employees through a volley of e-mail before that all-important first meeting. And it's usually an excellent way to find workers. Several areas don't charge for job postings, and for a minimal cost you can join specific employment databases. Alternatively, you can search targeted forums—college and university sites, professional forums, and so forth—to locate job seekers with the talent to take your business to new heights.

   The Internet Until recently, the Internet's human-resources benefits were only serendipitous. By using the Net, you more or less accidentally found out about people doing good work, made contact, and perhaps started the recruitment process. Today the Net offers a variety of employment locations, including several résumé posting areas. Still-active Gophers provide access to older resources, while the World Wide Web is quickly becoming every bit as important to job seekers and employers alike.

   The most complete listing of employment-related resource Gophers can be found in Gopher-Jewels. Gopher to cwis.usc.edu, enter Other Gophers and

Information Servers, then Gophers By Subject, Gopher-Jewels, and finally Business. This leads you to a huge list called Employment Opportunities and Resume Postings with more than 30 sites. Jobs are here in abundance, from the arts to the Defense Nuclear Facilities Safety Board. Spend a few hours searching through any of these and you'll get a good indication of who's looking for what kinds of people (you might also find a new career). And because many of the areas offer

Shop Around: CompuServe's Business Professional forum (Go CIS:BUSINESS) is a hotbed of qualified job candidates.

résumé postings as well, you can discover potential employees easily. One of the best-known Gopher sites for this is the Online Career Center at garnet.msen.com. Here you can post or search for résumés and link to other employment databases.

The World Wide Web has several important employment sites. One of the glitziest is CareerMosaic, found at http://www.careermosaic.com/. Designed for people who want to work in the computer industry, it promises a résumé posting service that you can use to find candidates. More impressive from an employer's standpoint is JobWeb—which is available at: http://www.risetime.com/ risetime /preview.html. This area is designed to allow companies to advertise positions and search résumés. Another winner is the E-Span Interactive Employment Network at http://www.espan-.com/, which offers separate sections for employers and job seekers, and a résumé database numbering in the hundreds. And for the latest wonder of the Web, visit the Monster Board (http://www.monster.com/). Despite its peculiar name, its huge array of employment material makes it a must-visit site.

Another important source of contacts on the Net is newsgroups. While some newsgroups have caused controversy over offensive and illegal postings, the fact remains that companies offer newsgroups and people try to locate jobs through them. Because it costs nothing to post your position to a

newsgroup, why not try it? If you get just one good candidate, it's well worth the effort.

America Online To locate potential staff on America Online, start with the Career Center. This widely used area is oriented toward those seeking jobs rather than employers, but as with most such services it can be used by either party quite profitably. Particularly useful from an employer's perspective is the Talent Bank, a database of online résumés that you can search according to keyword. Need a contractor? Type "contractor" in the search dialog box and watch the résumés appear onscreen. The same holds for any job category you may have in mind.

In addition, you can post job descriptions at no extra cost in the Classifieds section under Professional Employment Offered. You can also view the classifieds for Professional Employment Sought, which you might examine before posting a job description. America Online even offers the E-Span and Help Wanted USA databases of available jobs, from which you can make contacts. And you can advertise your positions in both.

CompuServe On CompuServe, the forums provide some of the best access to potential hires. Through the Professional icon (or Go Professional), you can access forums in business management, data processing/MIS, media services, engineering, technology, health, legal, and other lines of work. Inside these areas are specific forums, such as the Broadcast Professionals forum (in Engineering/ Technology), the PR and Marketing forum (in

WWW's Job Monster: Despite its garish name and appearance, The Monster Board is the career-search page of choice.

Entrepreneurial/Small Business), and the Photography Professionals forum (in Media Services). Once you get to a forum, enter the Library area and look for the item called Jobs or Member Profiles or whatever that forum chooses to call it. Here you'll find résumés and user profiles galore—and a place to publish your job listing.

I instantly felt comfortable with
my new computer.

OOBE: Making

I can't believe no one thought
of it sooner.

Human Resources

The Top Six Sites

1 The Online Career Center Gopher at garnet.msen.com features company profiles, detailed résumé listings, and employment assistance.

2 The up-and-coming Web site JobWeb (http://www-.risetime.com/risetime/preview.html) is an obvious source of recruitment information.

3 Seek out potential hires in America Online's Online Career Center—either keep an eye out for smart people in forums or search the Talent Bank.

4 CompuServe's Professional area (Go Professional) lets you access any number of specialty forums. The Library area of each forum stores résumés from people with relevant expertise.

5 Read postings on Prodigy's Careers Bulletin Board (Jump Careers) or post your vacancies by job type.

6 Prodigy's Classified Ads area (Jump Classifieds) is a well-used area with concise postings and an active readership. You'll pay for the posting, although not as much as you would in most newspapers.

CompuServe's training and specialty forums are worth a look too. The Computer Consultant's forum lists a wide range of specialists and gets you up to speed with assessing them. And within Information USA you'll find a Careers and Workplace area with job banks and links to areas dealing with training in specific careers—not a bad alternative as a second-tier resource.

Prodigy The most immediate area on Prodigy for locating personnel is the Careers Bulletin Board (Jump Jobs to access this and others). Here you'll find discussions about a wide range of employment issues, but chief among them are postings of available jobs or, more frequently, postings from people looking for work. A more important area

for finding potential employees is the Classified Ads area (Jump Classifieds). Here you can place notices for 30 days at a cost of $10 for the first page and $1 per additional page. There are correspondingly higher rates if you want to make postings available for a longer period of time.

As with the other services, following the special-interest and professional forums will bring you in touch with potentially suitable hires. In fact, because Prodigy's atmosphere is more evidently based on advertising and marketing, you can probably get away with postings that America Online and CompuServe subscribers would find annoying and Internet users would consider a serious crime against humanity.

Ads and **Marketing**

Everyone needs all the help they can get to make people aware of their products and services. That's what makes online services attractive. They offer a built-in audience, have attracted more media attention than Roseanne Arnold, and many of your competitors haven't a clue how to exploit them.

Marketing and advertising require both commitment and ingenuity. The trick is to learn the services well by exploring the material available in topic areas, reading and participating in the online forums and chat areas, and getting a feel for where companies are advertising and how they're doing so. Blindly dumping e-mail messages into subscribers' mailboxes isn't the answer. Those who try experience flames enough to barbecue the credibility of their businesses to a crisp. If you believe that any

But They're Everywhere! Prodigy's Ad Review lets you view all of the ads that are posted on the service at that particular time.

publicity is good, fair enough. If you don't—you're right. However, if you know your audience, there's room for effective marketing and advertising on any service, and there's room to be creative about it.

The Internet Forget what you've heard—the Internet is no longer unsullied by the taint of commercialism. Through organizations such as the Commercial Internet Exchange, it is now entirely permissible to use the Net for marketing, advertising, even sales. But this isn't to say that the gates have been thrown wide open. If you post ads to a newsgroup that doesn't invite them, you'll be flamed so badly you won't know what hit you. However, the World Wide Web is developing a very strong business focus, and this might very well be the place for you to begin.

How do you advertise on the Web? A number of options are available, and it's not necessarily an expensive thing to do. Essentially you need a Web presence, which means that you need a site Web users can get to at all times, 24 hours a day. You can do this through a complex sequence of establishing a server with its own high-speed lines to the Internet (about $20,000 in startup fees and $500 to $5,000 per month). Alternatively, you can rent space on a service provider's machine for somewhere between $50 and $1,000 per month, with a setup and design fee of $2,000 to $5,000. If you have an employee who can write Web pages, this rate dwindles. If not, it's usually cheaper to bring in a contractor.

To get an idea of how much advertising on the Web costs and how to go about it, see the list of Web space providers at http://www.directory-.net/dir/servers.html. From here, click on any of

COREL DRAW! 5™

The Best in Graphics and Publishing

With the new lenses in CorelDRAW 5 users can create incredible photo-graphic effects such as transparency, magnify, grayscale, brighten, invert, heat maps, and more. Dynamic special effects can also be created using morphing, artistic filters, and masking. With 60 new additional fractal textures, CorelDRAW 5 allows for unlimited design variations.

Exciting New Filters

Amazing Morphing

CorelDRAW 5 combines the graphics power of CorelDRAW and the advanced publishing capabilities of Corel VENTURA 5 within an integrated user interface. With a revolutionary color management system, major performance gains and hundreds of improvements, CorelDRAW 5 retains the ease of use for which Corel is renowned. CorelDRAW 5 is the most exciting value-packed graphics and publishing software available.

INCLUDES
- CorelDRAW 5
- Corel VENTURA 5
- Corel PHOTO-PAINT 5
- CorelCHART 5
- CorelMOVE 5
- CorelSHOW 5

PLUS
- 825 fonts
- 22,000 clipart images & symbols
- 100 high-resolution photos

CorelDRAW 5—"the best has gotten better!"
InfoWorld, August 1994-USA

"OUTSTANDING! CorelDRAW 5 really is the best graphics package ever!"
PC Answers, June 1994-U K

Versatile Charting

Power Publishing

Super Market

The Top Six Sites

1 The Commercial Sites Listing (http://www.directory-com/) provides you with Web pages to emulate.

2 The INET-Marketing mailing list (inet-marketing@einet.net) contains lively discussions about all aspects of marketing and advertising on the Internet. Expect as many as 20 messages daily, with a good hit rate of useful ones.

3 America Online's main menu is your first stop for marketing and advertising opportunities. Enter the various areas and see how others are developing a presence.

4 CompuServe's Shopping area (Go Shopping) features not only online ordering but also online marketing and advertising.

5 Prodigy's automobile showcase (Jump Autos) is worth visiting for examples of marketing online without sales online. You can advertise directly on this cover page.

6 Prodigy is an ad showcase. If you want to get a quick response, have your ad displayed on start-up and offer a button to let users see more.

the links to see what they offer for Web advertising or marketing. For example, the Apollo Advertising site at http://apollo.co.uk/ offers a list of the advantages of Internet advertising. This is an unusual site in that advertising is free, showing up on the Web much like classified ads. By contrast, Home Pages provide commercial space based on number of accesses and size of site. See http://wwwspace-.homepages.com/ for details. Moving into an Internet "mall" such as Downtown Anywhere (http://www.awa.com/) means negotiating a fee based on your individual needs, while many providers offer extensive lists of possible configurations.

Finally, there's the question of how to present yourself on the Net. Remember that you don't have to reinvent the wheel. Fire up the Commercial Sites page at http://www.directory.net/ and browse until you find something you like. Capture the Web page as a HyperText Markup Language (HTML) file by selecting the View Source or equivalent command on your browser, then start revising. Or get someone to do it for you. Several firms on the Web offer HTML authoring as part of their Web site package, but since HTML is hardly rocket science, it will be well worth your while to hire or train someone within your company to design pages.

Once you have the ad in place, you have to get the word out. There are several places on the Net to do this. Start with the Commercial Sites list (http://www.directory.com/), which offers specific details on how to post a new entry. Another natural is the What's New on the Web page (http://www.ncsa.uiuc.edu/SDG/Software/Mosaic/Docs/whats-new.html), an extremely popular—and frequently updated—site for Web users. As you become proficient on the Internet, you'll discover newsgroups and mailing lists that invite announcements of this type. Do not, however, simply post your ad blindly unless you want to incur the wrath of thousands of Net users.

Focused Marketing: Any of the areas on America Online can be helpful in supporting your marketing and advertising efforts.

America Online On America Online, start with Clubs & Interests from the main menu, then try Travel, Entertainment, Computing, and other topics. The strategy here is to establish an information area of your own within these subcategories, which is much the same as setting up a storefront in the MarketPlace (see "Doing Business," page 135). Alternatively, you can explore the forums in these
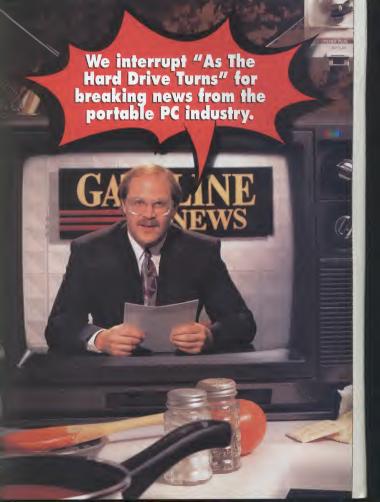
Credit Club: Visa's recent forays on the World Wide Web are a good example of how to advertise and market a company online.
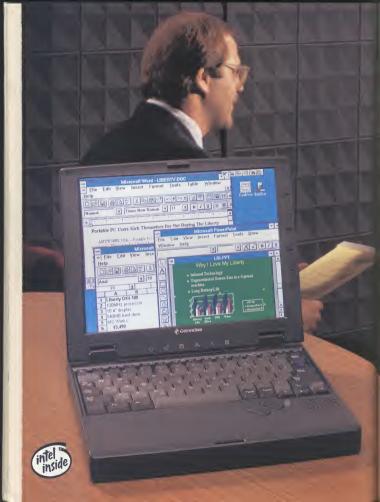
topic areas and establish a presence as a knowledgeable contributor in those related to your company's offerings. This will work as a public relations move by establishing your firm's name in the minds of the readers, and give you the opportunity to do some impromptu name-dropping about your products. You can also use these forums to establish mailing lists, and branch out later by developing your own forums to discuss your offerings.

CompuServe To market products and services inexpensively, give CompuServe's forums a whirl. Establish a forum of your own within a particular profession, hobby, or entertainment area, or browse the forums and respond to questions about available products with brief descriptions of what your firm has to offer. As with the Internet and America Online, doing this takes a fair bit of time because you need to understand each forum and its needs before taking the plunge.

A lower-maintenance marketing arena is the Shopping area. You don't have to set up an online store here. Instead, you can use the area to advertise and market your products, providing everything from free brochures and catalogs to online graphics designed to attract customers. It's expensive, but the audience you reach may make it worthwhile.

Prodigy When it comes to advertising, Prodigy is different from the other online services. Ads are on every Prodigy page, changing as you move from area to area and page to page. Prodigy is the most marketing-friendly service. There's even a

Reporter: We have an exclusive interview today with a person who wishes to be identified only as John Doe. Now tell me John, is it true you purchased a portable PC from one of those "other" companies?

John Doe: Yes sir, I'm afraid it is. I'm so foolish. I settled for a portable PC with a tiny 8.4-inch screen, a 250MB hard drive and minimum software applications. It sounded good at the time, but that was before I knew about the 4.2-pound Liberty™ from Gateway 2000.® Its impressive 10.4-inch screen has 53 percent more active viewing area than the 8.4-inch screen and it features amazing infrared technology that lets you use many cool IR features including wireless transfer. I'll still be transferring files with those darn cables while Liberty users can simply beam files back and forth between their desktop PC or another Liberty. Plus, the Liberty DX4-100 Best Buy has a powerful 100MHz processor combined with a massive 720MB removable hard drive, 24MB RAM, a TelePath™ 14.4 XJACK® fax/modem,

leather carrying case and Microsoft® Office Professional. How could I have been such a sap? I relish the thought of having a Liberty for about the same price. Now I have to enroll in the Portable PC Protection Program and start a new life. If only I had gotten the Liberty from Gateway 2000!

Reporter: Well, there you have it. This is just one of many portable PC buyers distraught because they bought a PC from one of the "other" companies. Remember, the Liberty is the latest and greatest development in portable computing. Unless you want to end up like this poor fellow, don't settle for anything less than a Liberty from Gateway 2000. Call them today! We now return to "As The Hard Drive Turns."

separate Ads page users can turn to (Jump Ads) when they want to see what's being offered without jumping through every service.

Prodigy's inclusion of ads in the topic lists is a potential gold mine. The Jump command (which helps users find keyword-based topics) opens a window of choices, and frequently one or more are labeled "ads," while others are labeled "shop" (for shopping areas). While this is different from magazine or newspaper ads, it might be more effective. Users choose to see the ads, which means they're already in the mood to see what you have to offer.

Doing **Business**

When it comes right down to it, you have to generate sales, then support those sales with customer service. CompuServe boasts over 2 million users; America Online and Prodigy kick in at over 1 million each, and the Internet is up around 20 million, with predictions of 100 million or more by decade's end. Can you afford to ignore a group whose participation online proves they have spending power?

As a sales area, the online networks are best for niche products or specialty services, especially those aimed at the high-tech industry. But financial and legal services are making their way online, so the concept of a niche market is losing its value.

Many reputable firms use online services for customer support. Hewlett-Packard, Microsoft, Digital Equipment Corp., and others offer interim upgrades, bug fixes, new drivers, and technical documents on the major services. This support may not create revenues, but it can reduce support calls and encourage sales.

Becoming a vendor on the commercial online services is more expensive than renting space on an Internet-connected server. But commercial services give you solid demographic information (something the Net cannot provide, though the students who traditionally populate the Net are themselves a targetable demographic group), and the commercial services know about sales volumes. They have a fully secure system for credit card purchasing and offer online promotion and built-in marketing.

One thing to keep in mind online, especially on the Internet, is to update your site often. If you want users to return to your offerings, you'll have to provide them with a reason for doing so.

The Internet What's on sale on the Net? Pick from more than 1,000 commercial sites on the World Wide Web's Commercial Sites listing at http://www.directory.net/. A few hours of browsing will teach volumes. From the legal offerings of Venable, Baetjer, Howard & Civiletti (http://venable.com/vhk.htm) through the product offerings of Computer Express (http://cexpress.com:2700/), you'll find something to emulate or avoid.

How do you trade? There are two ways: One is to have users fill out forms with purchase details, credit card information, and so on, and submit these online. The other is to offer online information but offline transactions—in other words, users call a toll-free number to order the goods or they establish an account with you over the phone and their online orders are then charged to that account.

The problem with selling over the Internet is security. Data is routed and rerouted any number of times during a transmission, which means it can be stolen. Several encryption technologies address this. RSA encryption enjoys the current lead—Netscape Communications, developer of the popular Netscape browser, uses it—and by the time you read this secure transactions should be possible.

For customer service options, browse the offerings by the big companies. Hewlett-Packard (http://www.hp.com/) Cray Research (http://www.cray.com/), Silicon Graphics (http://www.sgi.com/), The Santa Cruz Operation (http://www.sco.com/index.html), and Apple Computer (http://www.apple.com/) as well. These offer an excellent idea of how to construct a full and effective technical and client service site.

Let 1,000 Flowers Bloom: This Prodigy marketer offers splashy color, product photography, and credit card ordering.

Waiting *for the* green light *on*

2084

Do It: Transact Business Online

The cost to set up a sales or service site is similar to that of a marketing or advertising site. In fact, it's all part of the same site. Forms, graphics, and extensive documents drive up your overhead (space rents at about a monthly rate of $1 per megabyte), so expect a full service and sales site to run between $300 and $3,000 per month, perhaps even more. The good news is that you should start to see results within weeks of posting the site and making the Net aware it exists.

America Online If this is your service of choice, log on, choose Keyword from the Go To menu, and type a keyword. In the dialog box, type Greenhouse. This will demonstrate the commitment America Online has to developing its rather sparse MarketPlace.

Until December 30, 1994, America Online offered assistance for exceptionally creative entrepreneurs to establish a presence in the MarketPlace. While Greenhouse is no longer available as such, you'll discover some of what you need to know, especially America Online's forward-looking attitude in online sales. To become a vendor, however, you need to contact America Online at (703) 448-8700. At that point, you will enter a unique arrangement with America Online in which there are no standard packages or fees.

CompuServe The standard rate on CompuServe is $20,000 annually plus 2 percent of online sales. This fee gives you access to 2.5 million CompuServe members and full online promotion by the service. It lets you list up to 100 products with descriptions, 25 of which can have high-resolution images. To market in CompuServe magazine or on their CD-ROM costs extra, and your best bet is to call (614) 457-8600 to cut a deal. Incidentally, nearly 90 percent of vendors renew their CompuServe contracts, so something must be working.

CompuServe has the most fully developed online mall of the three commercial services. You can't buy a car over the wires, but you can order flowers and electronics items, plus computer hardware and software.

Prodigy The shopping area in Prodigy is attractive, colorful, and well designed. Your customers can see digitized photographs of your products and order via credit card. But Prodigy's store services are expensive. Offering a downloadable catalog costs $4,500 to set up plus a minimum of $1,000 per month ($2 per catalog downloaded). A catalog with an order form costs $7,500 to establish, the same $2 fee as before, and 15 percent of all sales placed over Prodigy for a minimum of $3,000 per month. Stores with products cost between $18,000 and $22,000 to build (with several options available), plus a monthly fee to be negotiated separately with Prodigy. To become a Prodigy vendor, call Online Commercial Marketing at (800) 776-3449.

DECISION MAKER BEST BETS FOR **DOING BUSINESS** ONLINE

1 Choose the factor that's most important to you. **2** Choose the next most important factor. **3** What else is important? **4** For your needs, the best service to use is …

Recruiting	Efficiency	Cost of Search	America Online
		Speed of Search	Internet
	Choices	Past Success of Candidates	CompuServe
		Number of Contacts	Internet
Marketing & Advertising	Cost	Low Entry Cost	Internet
		Exposure per Dollar	Prodigy
	Feedback	Demographic Profile	CompuServe
		Speed of Feedback	Prodigy
Sales & Service	User Accessibility	Ease of Shopping	Prodigy
		Ease of Access	America Online
	Cost	Return on Investment	CompuServe
		Ease of Setup and Updating	Internet

ONLINE

Scavenger Hunt

Every month, slackers and trivia buffs scour the Internet on a fun-and-games scavenger hunt. Not so the participants in *PC Computing*'s online expedition. We sent our cyberspace squad out into the online world to find solid information—data that could make a difference to a business.

There were four participants. Paul Friedman, vice president of technology for data analysts National Benefit Resources and a PC Contact sysop, trawled CompuServe. Rich Schwerin, editor of *PC Computing*'s I-Way Patrol, untangled the Internet web. *PC Computing* Senior Editor Howard Baldwin hooked up to America Online. And author Neil Randall took on Prodigy.

The quest: To answer tough questions businesses need answers to. Check out the "Scavenger Hunt" sidebars on pages 115 and 125 for details.

The results: Read on to learn how easily our intrepid online pilgrims found answers and how they rated the information once they found it. In some cases, online was the place to be. But in others, as Paul Friedman says, "Calling the public library would have yielded information faster."

Task	Best Sites	Completeness
Find It: Financial information —from tax tables to exchange rates. *Sample Questions:* What's the U.S./Canadian exchange rate? What's the best loan rate you can find? Where did IBM close on the Nikkei?	*First Place:* CompuServe. GO QUOTES *Runner Up:* America Online Personal Finance	More than 70 percent complete in 15 minutes.
Find It: Market trends that early business adopters can exploit. *Sample Question:* What is the disposable income of 30-year-old males in Northern California?	*First Place:* Internet Gopher.census.gov	60 percent complete in 10 minutes.
Find It: Industry inside information to fuel your competitiveness. *Sample Question:* What were the profits of Hewlett-Packard in the last quarter?	*First Place:* Internet quote.com and individual company Web pages	70 percent complete in 30 minutes.
Do It: Find good staff online and train them. *Sample Questions:* Where can I post my résumé online? Where can I locate civil engineering graduates for hire in the next quarter?	*First Place:* CompuServe. GO CIS:INDEX and a word or phrase for the job. For engineers, GO CIS:SAFETYNET and GO CIS:LEAP; NetWare engineers GO CIS:NOVFORUM *Runner Up:* America Online's Career Center and Education (Keywords: Careers, Jobs)	60 percent complete in less than 30 minutes.
Do It: Market your product online or leverage online resources. *Sample Question:* Where can I advertise products online?	*First Place:* Prodigy. Advertising is everywhere, D&B Online. *Runner Up:* CompuServe GO CIS: TRADE for the International trade forum (GO CIS:classified for advertising).	More than 60 percent complete in 30 minutes.
Do It: Conduct business over the wires. *Sample Questions:* Can I buy office furniture online? Where can I find network printer distributors?	*First Place:* America Online, (Keyword: Marketplace)	100 percent complete in 15 minutes.

USABILITY INFORMATION

Satisfaction	Resources Used	Comments	Verdict
"The forums available cover just about every topic imaginable." PF	*Using CompuServe to Make You Rich*, by Terry Dettmann and Susan Futterman (1994, The Waite Group Press)	"Some of the resources are surcharged reasonably, some are too expensive." PF "Is that Canadian$1.37 to U.S.$1 or vice versa?" HB	"I ignored the high-priced stuff; 50.01$ a lookup I can afford." PF
"Less of a net surf, more of a pleasure cruise." RS	"My trump cards: a shared T1 connection and WebCrawler (fromhttp://www/bio/tech/washington.edu/WebCrawler/WebQuery.html)." RS	"Fast, but I might eventually want more specific and tailored information." RS	"Researching gender ratios and age breakdowns on a county-by-county basis is handy. I'll definitely sell more widgets in Peoria." RS
"There has to be a cheaper way! I didn't find everything I wanted. Commercial services are better–you pay more, but you get exactly what you want quickly." RS	*The Internet Business Book*, by Jill and Matthew Ellsworth (1994, John Wiley)	"Very handy if the company you need information on is traded publicly; private companies are tougher eggs to crack." RS "You can order HP's annual report online, but it comes by snail mail." RS	"It's getting better all the time– you'll be able to access even more specific data by the time you read this." RS
"With more time and a greater willingness to enter the surcharged areas, I know I could have found more." PF	"Asking fellow members questions is my No. 1 resource." PF	"When I need information, I need it fast. I couldn't make use of the greatest resource on CI$ and ZNT: asking questions on the forums." PF	"Hang around forums and you will have no problem finding personnel. You will also learn many new and exciting TLAs (three-letter acronyms)." PF
"I'd like to call the service to find out more." NR	None needed.	"Offering up commercials is a no-no in forums, but being helpful is a great way to build a customer base. Forum regulars spread the word." PF	"There's no direct way of doing this." NR
"Pretty satisfied, but I'd like to know how the others are doing." HB	For America Online: "Didn't touch 'em." HB For the Internet: O'Reilley's Global Network Navigator	"You have to know the products; you have no idea what you're buying." HB "The Web's digital commerce continues to grow by leaps and bounds, but nothing beats buying direct." RS	"If you're buying, stick to the catalogs." HB

Online? It'z Not **Ze Same**

It was time for me to go online. I'd resisted for years. Despite the access to a global library and a chance to participate in international forums, I held back. There's something that I love about talking that you don't get with online keyboard chat.

For one thing, you can't whisper, yell, whistle, or do accents. Sure, you can write, "He whispered," or phoneticize dialects: "Ver iz de votka buttle, Hanz?" But it'z not ze same. Impressionists like Rich Little would have a hard time demonstrating their skills online. And the potential for fraud online is enormous. With everyone reduced to flashing fonts, you don't have any idea exactly who it is you're talking to.

Let's say you're about to close a big deal, then you find out the stats and figures you got online were actually created by a 14-year-old hacker in Sarasota, Florida. Hiring employees via an online service could be equally dangerous. You put out a message that you need someone who's an anthropologist and a musician for a dig and gig tour of the world. You choose the perfect candidate, only to find out that his bogus résumé was created by a 15-year-old from Sheboygan, Wisconsin.

With **EVERYONE** *reduced to* **FLASHING FONTS,** *you don't have any idea* **EXACTLY WHO** *you're talking to.*

Despite my paranoia, I made the plunge and logged on. I really wasn't expecting to find anything useful as I searched the Net for interesting data. Boy, was I surprised when I found a service that offered me pi to 1 million digits and this was just my first day. On the second day I found another posting that gave me pi to 1.25 million digits. I was really making progress. My fears seemed totally unwarranted. I found services with information about sourdough recipes, bondage, Aleister Crowley, pagan rituals, tax law, and postcard collections. I was really moving now. The jargon was happening. Gopher, Veronica, Jughead, coke service, finger service—everything was failing into place.

Then I saw the posting: "Newnet. Go beyond online. Dr. Bug." I was fascinated, did some research, sent some e-mail, and was invited by Dr. Bug to attend one of his classes on "going beyond the Net" at a local university. Two weeks later, I was there in a room filled with students waiting for Dr. Bug to enter. And when he did, I was shocked. I turned to the person next to me. "The guy's a flippin' insect," I said.

"Yeah, shut up and let him talk, will ya?"

For an hour and a half Dr. Bug spoke eloquently about how the online services are just a rip-off of what he called the "Insectnet"—the way insects have been communicating for millions of years—and how there's an incredible library of historical and genetic information that will soon be made available through online services. The Insectnet, he claimed, had tie-ins to an intergalactic network of cosmic information. Of course, there was a fee to get on, but it seemed worth it and much more interesting than sourdough recipes. The class let out, and I went up and asked Dr. Bug how I could get onto the Insectnet. He told me it would be some time before the hardware was complete.

"That's the problem with you humans. You need to build hardware," he said. "As you can see, our antennae and processors are all built in. You've got opposable thumbs. We've got built-in hardware. It's a trade-off, but there is a way. Give me $500."

I gave him the money, and he gave me a strange bottle of shampoo. I dashed home and washed my hair, making sure to follow the specific instructions on the bottle of shampoo. One week later, I had antennae buds bursting from the top of my scalp. I knew then that I would soon be surfing the files on the Insectnet.

I've gotta go now. I'll buzz you later. I've got to get back to the hive. My queen needs me.

CHARLES FLEISCHER *is a Los Angeles–based comedian who still thinks surfing requires a beach, a soundtrack by Brian Wilson, and a board.*

PHOTOGRAPH BY ALAN LEVENSON

1995

FemmeNaturelle

£

Tektronix

Color is color, unless you have delicate skintones.

Introducing the Phaser™ 540 color laser printer, the first desktop laser to print with photographic quality. It uses our continuous tone technology to produce prints unequaled by any half-tone color laser—that is, by *any* other desktop color laser. Imagine how polished your business charts will be at 600 dpi! And how easily they will print at nearly 4 pages per minute in full color. Naturally the

Phaser 540 prints on your letterhead in elegant color or precision black. And features Adobe™ PostScript™ Level 2 and Pantone's certified color. It networks to support any computers you choose. And it's from Tektronix, a Fortune 500 leader, where quality in workgroup color lasers passes the skin test with flying colors.

Free output sample, call
800-835-6100, Ext. 1049.

Tektronix

Circle 123 on reader service card.

We put a technical expert

Now, your PC will be easier to use than ever before. IBM PC Direct™ has loaded every IBM PC 300* with helpful features and software from diagnostics to modern communications functions.

Service and support is easier than ever with IBM Online Housecall. It's a preloaded application that connects your PC directly to the 24-hour IBM HelpCenter® (modem required). From there, specially trained IBM technicians go online with your PC. They analyze your files and hardware, and usually take care of everything.

- Your preloaded software includes an *easy-to-use* tutorial. It takes you through diagnostics, automatic scheduling and more.
- You'll quickly and easily use features like IBM's exclusive Rapid Resume™, with scheduling features for unattended automatic printing, backups and more.
- Have your system "wake up" at a preset time, **turn itself on**, and get ready for a fax. Or it can run an application unattended and fax the output back to you.

- You can change your monitor's resolutions and color capability on the fly. No need to reboot, even in Windows™. Try doing that on one of our competitors.
- Our built-in power management software can save you money. (We're Energy Star compliant,‡ of course.) And our Plug and Play configuration software makes adding on to your system easier than ever.
- NetFinity™ makes it easy to track the state of your system, monitor, memory and more.

At IBM PC Direct, you can count on the IBM HelpCenter for service and support.

- Via telephone with our 24-hour HelpCenter support line
- Via modem on our 24-hour online bulletin board service
- Via fax, with our 24-hour fax-back service

At IBM PC Direct, your PC 300 comes with 3-year limited warranty including parts and labor for all 3 years and 1 year of onsite service.

You'll appreciate the video performance offered by the 32-bit local bus graphics.

On the Desktop models our local bus enhanced IDE controller allows you to connect up to 4 hard drives of 1GB each.

The sliding security panel makes it virtually impossible for someone to go inside your PC.

Every IBM PC Direct purchase comes with a 30-day moneyback, no-questions-asked guarantee.

in every IBM PC 300.

*The perfect PC starts with CustomerFit: a PC that's built to fit the way you work, and the life you live. That's why we begin every phone call by **listening to you.** At IBM PC Direct, Customer-Fit insures a complete IBM Personal Computer system that's perfect for you.*

*Selectabus gives you your choice of VESA/ISA or PCI/ISA local bus architecture. Later on, if you want to change your mind and change your local bus, **it's easy and economical.***

*The IBM PC 300 is **PCMCIA enabled.** If you use a laptop too, you'll appreciate the convenience and flexibility this offers.*

IBM PC 300 SpaceSaver	IBM PC 300 Desktop	IBM PC 300 Pentium
For more power:	**More power:**	**More power:**
• an Intel® 486 processor chip	• an Intel 486 processor chip	• an Intel Pentium™ 60MHz processor chip
• Math coprocessor	• Math coprocessor	• Math coprocessor
• Upgradable to 256KB L2 cache	• 256KB L2 cache	• 256KB L2 cache
• Enhanced IDE 270MB² HD (upgradable to 1GB HD)	• Enhanced IDE 364MB² HD (upgradable to 1GB HD, expandable to 4 drives)	• Enhanced IDE 540MB² HD (upgradable to 1GB HD, expandable to 4 drives)
• 4MB RAM (expandable to 128MB)	• 8MB RAM (expandable to 128MB)	• 8MB RAM (expandable to 128MB)
• VESA local bus (upgradable to PCI with Selectabus)	• VESA local bus (upgradable to PCI with Selectabus)	• PCI local bus
• 32-bit VESA local bus graphics	• 32-bit VESA local bus graphics	• 64-bit VESA local bus graphics
For expansion needs:	**For expansion needs:**	**For expansion needs:**
• A SpaceSaver configuration with 3 slots, 3 bays	• A full Desktop configuration with 5 slots, 5 bays	• A full Desktop configuration with 5 slots, 5 bays
450/DX2	**450/DX2**	**Pentium 60**
$1578	**$1895**	**$2913**
IBM Credit Lease $56/month†	IBM Credit Lease $68/month†	IBM Credit Lease $104/month†
466/DX2	**466/DX2**	
$1828	**$2145**	
IBM Credit Lease $65/month†	IBM Credit Lease $77/month†	
100/DX4	**100/DX4**	
$2328	**$2645**	
IBM Credit Lease $83/month†	IBM Credit Lease $95/month†	

Also standard on every IBM PC 300:

• 14V Color Monitor with a maximum diagonal viewable screen size of 13"	• IBM standard 101-Key Keyboard and Mouse	• 3-year warranty includes 1-year onsite service†
• 1MB video memory	• Plug and Play enabled	• 30-day moneyback guarantee†
• Upgradable to future Pentium technology™ or Intel chip	• Energy Star Compliant	• DOS, Windows and IBM Easy Tools
	• PCMCIA enabled	

WinWriter™ 200. The laser printer built specially for Windows.

• 300 x 300 dpi laser technology
• 4 pages per minute
• 22 fonts included
• 30-day moneyback guarantee†

Only **$475.**

IBM PC Direct

To order call today!
1 800 426·7255
enter source code 4837.

Double-Duty Databases

You're finally unplugged—you don't rely on a mainframe database for life support any more. You can choose from a handful of PC databases that should make departmental data access and application development as easy as all your other Windows applications. But are they really that easy? Combining the power of databases with the ease of Windows seems like a sure way to make your users ecstatic and your application backlog extinct. The question is, are Windows databases practical or problematic?

Building a Windows database presents software developers with a unique challenge. It needs to be powerful enough for developers to build robust applications. But it also must be easy enough for end users who may not know database fields from Mrs. Fields.

To try to find the most suitable database, *PC Computing* evaluated Windows databases from the top software vendors in our Usability Labs: Borland International's dBASE for Windows and Paradox, Lotus Development's Approach, and Microsoft's Access and FoxPro. We sent two groups through our usability tests: power users, defined by their breadth and depth of database experience, and end users, who had more limited experience.

In our quest for backup data, we also ran the databases through some rigorous performance testing. Just for fun, we also invited the software vendors to send their best developers into our Usability Labs for a day. See "In Expert Hands" (page 170) for a look at what the very best can do in crunch time.

We suspected that a database that didn't require programming knowledge would be a big hit with end users, and it was. But guess what? The power users loved the simplicity of point-and-click too. The combination of Windows' ease with databases may still have some kinks to work out, but if you're searching for a database for all of your users, good news follows.

BY YAEL LI-RON AND JOHN MONTGOMERY

A POWER USERS' ACCESS: Surprise—they all praised the Table Wizard as a useful tool.
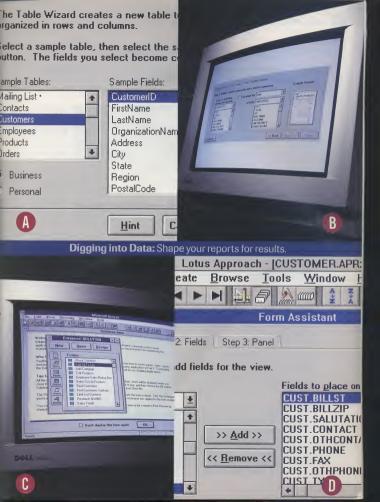
B POWER USERS' APPROACH: None of them missed cryptic codes when presented with the more usable interactive environments.

C END USERS' ACCESS: They loved the way the catalog feature consolidates information and gives them easy access to related files.

D END USERS' APPROACH: It's hard to imagine how they ever created reports without built-in assistants.

The Table Wizard creates a new table t[o]
organized in rows and columns.

[S]elect a sample table, then select the s[ample]
[b]utton. The fields you select become c[olumns]

[S]ample Tables:

- [M]ailing List ·
- Contacts
- Customers
- Employees
- Products
- [O]rders

○ Business
○ Personal

A

Sample Fields:

- CustomerID
- FirstName
- LastName
- OrganizationNam[e]
- Address
- City
- State
- Region
- PostalCode

B

Hint | **C**

Digging into Data: Shape your reports for results.

C

Lotus Approach - [CUSTOMER.APR:

[Cr]eate   **Browse**   **Tools**   **Window**   [Help]

◀ ▶ ▶|

Form Assistant

2: Fields | Step 3: Panel

[A]dd fields for the view.

Fields to place on

- **CUST.BILLST**
- CUST.BILLZIP
- CUST.SALUTATI[ON]
- CUST.CONTACT
- CUST.OTHCONTA[CT]
- CUST.PHONE
- CUST.FAX
- CUST.OTHPHON[E]
- CUST.T[Y...]

>> **Add** >>

<< **Remove** <<

D

DATABASES

All Users: **Arranging Tables**

PC USABILITY Tested

The applications that did best were the ones that gave a helping hand in the initial stages of building a database. Look for built-in aids that help you build tables right up front. These Wizards, Assistants, and Experts slice the time it takes to get interim results good enough for colleagues' feedback.

Table Wizard - Step 2 of 3

By which fields do you want to sort the records?

Select each field you want to sort by and click the Add button. (Select up to 3 fields.)

Available Fields:
- TimeBilled
- ProjectID
- BillDate
- HourlyRate
- NumBillHrs

Sort Order:
- CustomerID
- Emp

Add · Remove · Ascending · Descending

Help · Cancel · < Back

FoxPro: If you think of FoxPro as a power user's database, think again. In the most basic task—creating a table—it was the favorite thanks to its intelligent Table Wizard. You'll find the same shortcut in Access too.

Table Structure (Untitled)

Name: Untitled Type: DBASE
Updated: 03/28/95 Bytes Used: 17
Records: 0 Bytes Left: 32,750

Field	Name	Type	Width
1	LNAME	Character	16
		Numeric	
		Memo	

dBASE: Table creation is easy with drop-down lists. Users found the way dBASE walked them through the steps was better than using online help.

Creating A Table

Paradox categorizes fields into several types. A field type determines the kind of data you can enter in a field. Number, Alpha, and Money are field types.

3 550.00 Product ID is Number, so it accepts only numbers.

Lobela Product Name is Alpha; it

Paradox: Coaches are a welcome addition to the complex system of online Help and Experts.

Table Talk

Information is flowing into your organization at an exasperating rate, and only a new database will give you any hope of managing it all. But where do you start? At the heart of any database lies a table structure, a place where you can insert information. At its simplest, it's a table of rows and columns. But before you can enter data into the table, you must design it to include all the pertinent fields. We asked our testers to create a table, then modify the table's structure to include an additional field. Sound easy?

Curiously enough, Lotus's Approach, our overall usability winner, wasn't as well received.

Our testers praised the straightforward interface of Microsoft's FoxPro—especially the Table Wizard that guides you through the table creation phase. They credited the interface with the success of the operation. Some complained about fields being limited to ten characters (an anachronism we can thank dBASE for), but this was a minor weakness.

Creating a table was easy in both Microsoft's Access and Borland's Paradox. Our testers liked Paradox's Coach; it's a step up from an Expert in that it works with data you already have to build what you need.

SUMMARY

	Access	Approach	dBASE	FoxPro	Paradox
Satisfaction	Simple and straightforward.	Not quite there.	Delivers on its promise.	Best overall.	Smooth sailing.
Productivity	Perfect score.	Very impressive.	A regular power tool.	Doesn't get any better than this.	Users were impressed.
Help System	Satisfactory.	Painfully lacking.	Needs help.	Less than satisfactory.	Usable but lacking.
Summary	★★★★	★★★½	★★★★	★★★★½	★★★★

*****Excellent ****Good ***Acceptable **Poor *Unacceptable*

All Users: **Importing Data**

Chances are you already have all the data you need—it's just stored in places you can't get to very easily. All you have to do is import it from an existing file to populate your database. Too bad it's not always that simple. Approach has made the process so streamlined, its competitors should take note.

The Script
How We Tested Importing Data

We asked our usability testers to take information we provided in comma- and tab- delimited text files and add it to a table that they had already created.

Lab Notes
What Our Testers Said about Importing Data

"After endless slogging through [FoxPro's] manual, I got as far as finding the process, but the description seemed to start somewhere in the middle."
COMPUTER CONSULTANT

"I was really impressed with [Approach's] field assignment dialog box."
TECHNICAL SUPPORT ENGINEER

FoxPro: Many testers failed to get FoxPro to import their data. The documentation gives no clues.

dBASE: Contrary to common sense, File, Import doesn't import data—it's only for importing spreadsheets.

Approach: Our testers found Approach's data import tools to be the best of this group. Clicking on "Import options" lets you add data as new records, import data to update existing records, or do both simultaneously.

Import Duties

What good is a database without any data? But where do you get the data? Unless you feel like typing in a few thousand records, the answer is probably some kind of file that already exists. We asked both our power users and end users to pull information from a comma-delimited file (in which the fields of information are separated by commas) into each of the five database programs. If you're trying to take advantage of old data and a new database, this is a crucial step.

The result was a hands-down usability win for

Approach. Our testers praised it highly, citing data import as its best feature. When it imported text, it lined up the data in the proper fields smoothly—with no guesswork about matching text to fields. Another reason for its popularity: a well-designed online help system led users directly down the right path.

All of the others earned poor overall marks for data import. Even with its new Windows version, testers found the dBASE for Windows interface downright unfriendly; a third of them couldn't even finish the data import task. Testers' reactions to Paradox were similar: Overall, it was a hassle, and the online help provided no guidance.

SUMMARY	Access	Approach	dBASE	FoxPro	Paradox
Satisfaction	An experence not to be repeated.	Power user heaven.	Less friendly than a grizzly.	Don't bring it home to mom.	Not for the inexperienced.
Productivity	Appending data is confusing.	Perfect.	File, Import doesn't work for data.	*Append not Import* is confusing.	Odd file formats cause problems.
Help System	Hints sometimes cryptic.	Help is explicit.	Documentation has errors.	Slog through those manuals.	Helpful for advanced users.
Summary	★★½	★★★★½	★★½	★★	★★

★★★★★ Excellent ★★★★ Good ★★★ Acceptable ★★ Poor ★ Unacceptable

DATABASES

End Users: **Creating Forms**

It's not often that we see perfect scores in our Usability Labs, but this time Microsoft's Access shone with glowing reviews and a perfect five-star rating. Overall, though, this category is a strong suit for each of the applications.

Access: Creating professional-looking forms (or screens) is made possible with custom controls from the floating toolbar. You can add any object to your screen, from radio buttons to check-off boxes to charts.

dBASE: The Form Expert shows the results of your different selections in a preview screen, so you can be sure that the colors don't clash and the text stands out just right.

FoxPro: Creating VCR-style buttons on your form with this Screen Wizard is as easy as selecting a picture button. Add some special effects to the fields on the screen, and your professional-looking screen is ready.

The Script
How We Tested Creating Forms

Our usability testers were presented with a hard-copy facsimile of what the form was to look like, and were instructed to use any tool available to create that screen.

Lab Notes
What Our Testers Said about Creating Forms

"The [Access] Form Wizard led me through the process with no problems at all."
PROPERTY MANAGER

"Having designed a form manually, I found this difficult. But the [Paradox] Form Expert made it easy."
SYSTEM ADMINISTRATOR

Form Functions

The value of Windows, of course, is its intuitive interface. That's especially important when you have a custom-built database application that will give users the ability to input data in the easiest and most efficient way. All of the databases we tested offer tools for building forms (or data-entry screens). You may think of form-building as a task strictly for power users, but that's changed—end users can now create professional-looking forms with all the necessary muscle. This assignment went smoothly for

all of our end-user testers, with only a few glitches.

Creating a form in Microsoft's Access is as simple as interacting with the built-in Wizard, Microsoft's utility for creating something complex by posing simple questions to the user. Based on the answers, the Wizard handles both aesthetics and function. It draws the screen, then lays out the specified fields. Users can then tweak the results to fit their needs.

The other four programs were all second among equals. Like most Microsoft products, FoxPro also has a powerful Wizard and although it's targeted more toward power users than end users, our testers praised the resulting interface for its elegance.

SUMMARY	Access	Approach	dBASE	FoxPro	Paradox
Satisfaction	Our testers praised it highly.	Smooth sailing.	Nice and easy once underway.	Only slightly lacking.	Easy street.
Productivity	A painless process.	A cinch, said users.	Impressive.	A few missteps but good results.	Easy and almost always friendly.
Help System	No one needed to access it.	Could do better.	Very helpful for most testers.	Best overall.	High marks.
Summary	★★★★★	★★★★	★★★★	★★★★	★★★★

★★★★★Excellent ★★★★ Good ★★★ Acceptable ★★ Poor ★ Unacceptable

Get your FEET WEt ON THE INTERNET

Power Users: **Creating Forms**

PC USABILITY Tested

Power users didn't fare too well in this task, mostly because all of the applications insist that the queries to be built must be determined prior to the creation of forms, which is not when it's most convenient for the person building the form. Even though Approach was again the leader, satisfaction with the results overall wasn't high.

Access: If you don't select a table or query prior to running the Form Wizard, you get this error message. It would be better if it took you to a "browse" screen so that you can make the selection.

Paradox: Rather than leave the user hanging, why can't this error message make suggestions or explain the problem in more detail? Send help!

Approach: When you need to assign values to checkboxes, just fill in the values in this table—no IFs, ENDIFs, or BUTs. A similar routine in any of the other databases would involve several lines of code.

The Script
How Power Users Tested Creating Forms

We gave the power-user group of usability testers a hard-copy drawing and asked them to recreate it as a screen based on fields from three different tables.

Lab Notes
What Our Testers Said about Creating Forms

"I created the [FoxPro] form using the Wizard, but found it easier to correct my mistakes not using the Wizard."

SEMICONDUCTOR EQUIPMENT MECHANIC

"Creating an Approach form was as simple as choosing the Create menu and selecting Form. Since the data was pulled from more than one database, the relevant tables needed to be joined first. That took a little time to figure out."

CATALOGER

Forms Get Formal

Simple data-entry forms built by end users are great—they offload that work from more experienced power users. But just because power users have more experience doesn't mean you should ask them to work harder. If anything, because they're working on building forms, reports, and menus all day long, power users should have tools that make them just as efficient. Here's where you'd hope the visual capabilities of Windows would pay off, but in our tests they didn't.

In the past, creating a form (or data-entry screen)

required typing many lines of code. The visual tools available in the applications we tested have improved upon this. We asked power users to create a form from three tables. However, none of the programs had tools to help users link a table at the same time they created the form. This proved highly frustrating, severely affecting the bottom-line score for this task.

While Lotus's Approach lead this round—with most of the other packages not too far behind—the power users found the databases significantly less usable overall than the end users did.

Thanks to its friendly and powerful forms Expert, Borland's Paradox came in second overall.

SUMMARY

	Access	Approach	dBASE	FoxPro	Paradox
Satisfaction	Not quite there.	Testers were pleased with ease.	Mixed reactions from testers.	Testers were flummoxed.	Noticeably lacking.
Productivity	Problems here.	Users appreciated the relative ease.	Lots of backtracking limited productivity.	Failed miserably.	Powerful Expert didn't go unnoticed.
Help System	Very good.	A bit lacking.	Not much help.	You're almost on your own.	Needs to be spruced up.
Summary	★★	★★★	★★	★½	★★½

★★★★★ *Excellent* ★★★★ *Good* ★★★ *Acceptable* ★★ *Poor* ★ *Unacceptable*

End Users: **Building Queries**

When it comes to pushing a mountain of data into a molehill of useful information, you rely on a database's query designer. With the best query tools, you just have to click on a few fields. Once testers overcame the initial learning curve for queries, they were pleased. The verdict: If you know where to look, queries are fairly simple.

Find Special dialog

Approach: Locating Approach's Find command seems to be the most difficult aspect of getting it to run a query. After that, you just click on a few boxes and fill in a few blanks to track down your data.

Paradox: The query-by-example command helps you get data quickly and easily.

Access: Need data fast? Send Query Wizard to the rescue. But after that, finding empty fields is difficult.

The Script

How End Users Tested Building Queries

We asked our end users to perform two actions: first, create and save a query that would search for everyone living in a certain zip code, and then find all the people without phone numbers.

Lab Notes

What Our Testers Said about Building Queries

"Once I figured out to look under 'Find' rather than 'Search,' [querying with Approach] was straightforward."
PROPERTY MANAGER

"The problem [with dBASE] was determining how to start."
TECHNICAL SUPPORT SPECIALIST

Form of a Question

Are you in jeopardy if you don't know how many widgets your factory produced this month? Are you in double jeopardy if you have that answer but don't know how many of those widgets didn't have flanges? These are the kinds of simple queries that we asked our end users to run with each of the five databases. All five did well, with Lotus's Approach and Borland's Paradox leading the group.

The end users used several methods to figure out how to repeat queries with Approach. While they all

applauded how easy it was to search the database, some had problems finding the actual search command. Others had trouble determining how to save the query for future use. When it was done, however, they praised its simplicity.

When it came time to focus the query further—looking for the flangeless widget—things became more complicated. Some end users simultaneously praised Paradox for being easy to use and bashed it for what they perceived as "quirks." Several testers remarked that they had trouble with the syntax to find an empty field until they consulted the manuals. Ditto for Microsoft's Access and FoxPro.

SUMMARY

	Access	Approach	dBASE	FoxPro	Paradox
Satisfaction	Query Wizard is a help.	Very nice and simple.	Frequently difficult to decipher.	Query Wizard is great.	Intuitive and fast.
Productivity	Hard to find missing data.	Perfect score.	Superb.	It's a capable, query tool.	Looks great.
Help System	Could be better.	Good, specific examples.	Not too useful.	Online help is confusing.	Just acceptable.
Summary	★★★½	★★★★	★★★	★★★½	★★★★

*****Excellent ****Good ***Acceptable **Poor *Unacceptable*

DATABASES

Power Users: **Building Queries**

PC USABILITY tested

Database power users tend to have different needs than end users—needs that are far more demanding. Nevertheless, they praised Lotus's Approach, a package targeted at end users almost as much as Microsoft's FoxPro, which is targeted at power users.

Paradox: Poor documentation seems to have hindered testers in joining tables. This task upset them more than any other.

Search

Type a *word*, or select one from the list. Then choose Show Topics.

join

Invisible command
Just Current Field command
key fields
key violations
keyboard shortcuts
keycode

Cancel

Show Topics

Approach: For a database without a programming language, Approach sure makes users happy.

Lotus Approach
File   Edit   View   Create   Browse

OK   Clear Fin

Enter the record or perform the find

Updatable Query Wizard - Step 1a of 5

To relate the tables, select a matching key field in each.

Click the Add button to set the relationship.

☐ Outer Join

Parent Table: Child Table:
Customer.Cno   ⬦   ⬦   Parts.Pno

Add
Remove

Customer.Cno = Invoices.Cno

Help   Cancel   < Back   Ne

FoxPro: When the going gets tough, the tough turn to FoxPro. It may not have the slickest interface, but it knows how to make complex table joins.

The Script
How We Tested Building Queries
Power users created and saved a query joining three tables on one field, then had it put the result into a formatted table.

Lab Notes
What Our Testers Said about Building Queries
"[FoxPro's] Wizard prompted me to save the query if I planned to use it in the future."
CATALOGER

"The steps to create the query [in Paradox] were cumbersome. There seemed to be considerable and unnecessary clutter on the screen."
PRODUCT MANAGER

The Inquiry Goes On

Just a few more things we'd like to ask. For instance, how does topic A relate to topic B in conjunction with topic C? In database terminology, you get the answer to a complex query like this by joining three tables, each relating to a different topic. Something called a "three-table join" sounds like it should be simple, but it lies firmly within the purview of power users. Windows databases haven't progressed that far yet. Not surprisingly, Microsoft's FoxPro pleased the testers most.

With its xBASE development language, FoxPro admittedly targets power database users more than end users. However, applications for power users tend to be somewhat, shall we say, *difficult* to use. But FoxPro's Query Wizard breaks that mold. The usability of the Query Wizard was universally applauded by our testers.

Lotus's Approach followed close behind FoxPro, although it uses the term *find* rather than the traditional database term *search* or *query*. Although one tester found this refreshingly obvious, it threw some testers for a loop. Aside from that, the power users agreed with the end users that Approach made it easy to both create and save queries.

SUMMARY	Access	Approach	dBASE	FoxPro	Paradox
Satisfaction	Middle of the road.	Easy to create and save queries.	Problems here.	Wizards make it easy to be powerful.	Road kill.
Productivity	It took a while to work through.	Quick and fruitful.	No particular productivity.	Incredibly fast.	Obstacles and hurdles everywhere.
Help System	Testers found the answers.	Well done.	A big boost to its score.	Some gaps, but acceptable.	Some never did figure it out.
Summary	★★	★★★½	★★½	★★★★	★½

*****Excellent **** Good *** Acceptable ** Poor * Unacceptable

DATABASES

End Users: **Compiling Reports**

PC USABILITY Tested

All of the end users struggled with creating reports, so although Approach and Access received relatively high marks, there was no clear winner for this task. Unlike the results in other tasks, testers were moderate in their praise of the leaders here. There were stumbling blocks on the way to the finished product.

Approach: The Report Assistant mixes The Next button and a tabbed approach.

Paradox: Buried inside the Report Expert is a nifty tool for outputting the report to the screen at a selected resolution.

Access: The Report Wizard is useful, but it misses a visual element. It would be nice to see a thumbnail view of the report you've selected, so you'll know whether you're on the right track toward the end result.

The Script
How End Users Tested Compiling Reports

We asked usability testers to take the data they'd been working on in the tables and create a report summarizing information.

Lab Notes
What Our Testers Said about Compiling Reports

"Creating the report in Approach was impossible. It was very frustrating."
TECHNICAL SUPPORT STAFFER

"[Access] was easy, but the result was 60 pages long. It wasn't easy trying to figure out how to streamline it."
ASSISTANT DIRECTOR OF PLANT OPERATIONS

Needles in a Haystack

The power of databases has always been their ability to consolidate an abundance of business information. Windows contributes the capability to not only access sections of the data, but to massage them into useful reports as well. Database reports are like venetian blinds for data: If they're designed well, you can adjust them to see just what you want, when you want it.

However, testers found the adjustments harder than they expected when we asked them to create and then modify a simple report. Their reactions

were decidedly mixed about the process, and no one product came out shining.

Testers complained that Lotus's Approach had no obvious way to get to the report creation tool, but once they found it, the process went somewhat smoothly. Similarly, Microsoft's Access received mixed reactions. Creating a report was a fairly easy task, thanks to the Report Wizard. But when testers were expected to add a chart to the report, some serious tooth-grinding resulted.

The others did not fare well either. FoxPro's Wizard and the Borland products' Experts were not as intuitive as our testers hoped they would be.

SUMMARY	Access	Approach	dBASE	FoxPro	Paradox
Satisfaction	Wizard made it possible.	Surprisingly mediocre results.	Lowest scorer in this round.	Second to last, poor score.	Lots of dissatisfaction.
Productivity	Not all testers completed the task.	Assistant held testers' hands to completion.	Failure rate was alarming.	More like non-productivity.	Poor results.
Help System	Well-documented, online and in manual.	Somewhat useful, but far from perfect.	Glaringly lacking, both online and in manual.	Lacking and non-intuitive.	Lowest help scores overall.
Summary	★★★	★★★	★★	★★	★★

★★★★★Excellent ★★★★Good ★★★Acceptable ★★Poor ★Unacceptable

Does the perfect office really exist?

Why is it

my one-page

faxes are always

two lines

too long?

DATABASES

Power Users: **Compiling Reports**

PC USABILITY Tested

The collected Wizards, Experts, and Assistants weren't enough to make report generation a painless task for our power users. Lotus's Approach, however, stood out among the rather disappointing marks. Not surprisingly, its Assistants won the usual praise. For the most part, it was a simple matter of following the bouncing ball to come up with a snazzy result.

Approach: Follow the steps—set up the layout, choose your fields, choose the information to summarize. Nice hand-holding all the way through. It won't even let you move on until you've made a selection.

Access: Once the Wizard creates the report, go in and tweak to your heart's content. But be prepared to invoke some cryptic commands if you want to add some real computing muscle.

FoxPro: The Add All and Remove All buttons are great shortcuts. These are welcome features in the FoxPro Report Wizard, but they're mysteriously absent from Approach.

The Script
How Power Users Tested Creating Reports

We asked power users to take the data they'd been working on in the tables and create a report summarizing information.

Lab Notes
What Our Testers Said about Creating Reports

"It seemed easy [in FoxPro], but the report wouldn't appear at first."
— **COMPUTER CONSULTANT**

"The shortcoming [with Approach] is that you must use the Expert. The way to build it [using the banded method] isn't apparent."
— **ENGINEER**

Strike Up the Band

While Windows brings consistency to database applications, databases have some underlying consistency of their own. All of the products we tested employ the standard yet unofficial approach of laying out the information for reports in *bands* (think of the green and white stripes on dot-matrix printer paper to imagine the effect). Nevertheless, although this banded approach has been around for several years, our power users struggled to achieve the proper effect in some cases.

Even with help of the intelligent agents—the various

vendors' Wizards, Experts, and Assistants—there were some concerns. In this phase, the power users were slightly happier with their results than the end users, but not a single program came out shining. Lotus's Approach won this round, but not without its own minor hiccups.

Microsoft's Access and Borland's dBASE for Windows came in closely behind Approach, earning varying degrees of satisfaction. Our testers created the reports with the help of the agents, then further modified and tweaked the designs. One tester suggested that it would have been more helpful if the products simply offered a customizable default layout.

SUMMARY

	Access	Approach	dBASE	FoxPro	Paradox
Satisfaction	Passable, but not nearly good enough.	OK, but not as much as expected.	Users weren't thrilled.	The task should have been easier.	Very low rating.
Productivity	Too low for an important tool.	Highest score (tied for first with dBASE).	Tasks were completed.	Not quite good enough.	Not there at all.
Help System	Very good.	Barely serves its purpose.	Needs work.	Painfully lacking.	What documentation?
Summary	★★★	★★★½	★★★	★★½	★★

*****Excellent ****Good ***Acceptable **Poor *Unacceptable

DATABASES

Power Users: **Custom Controls**

PC USABILITY Tested

After the dust has settled on your original form design, it's time to tweak it. We were particularly interested in adding a drop-down list box—one of those features you'd think would be easy to create. It wasn't. Some testers suggested that they could have completed the task with more time.

To locate a prospect:

AB Distributors
ACC Distributors
East Street Dist
Norton Dwel
Seaport Co
Simpson D

Approach: All of the testers agree that it's easy to make simple changes to a form—but that's why they're called "simple." When it came to adding the list box, Approach was the product that came through most often with smooth and easy amendments.

Access: After the Wizard's finished, you can start dragging and dropping for most of your changes.

FoxPro: Another Wizard—adding pop-up screens this time—means another easy modification.

The Script
How We Tested Custom Controls

We asked testers to take the form they created in a previous task and move one field slightly, and then add a drop-down list box that included five items.

Lab Notes
What Our Testers Said about Custom Controls

"It was easy to make a simple change to the form. However, the process for creating a drop-down list box was unnecessarily hard to find [in Approach]."
PRODUCT MANAGER

"I came closer to creating a list box with Access than with any of the other products."
CATALOGER

Customs Declaration

Only in a fairy tale would the grizzled old power user create a database application and have it live happily ever after. Here in the real world, users' comments are more likely to sound like this: "This is great, but now that I see it, you know what I'd really like it to do?" All of the databases we tested make it pretty easy to create a data entry form—the Wizards, Experts, Assistants, and all sorts of other gadgets simplify the process. But what happens when the end users—or even the power user building the application—don't like the way the

intelligent agents lay out the fields? How easy will it be to incorporate changes? It will rarely come out right the first time, and you'll never get rid of a backlog with the iterative process isn't smooth. So the power users tried this trick—it's not an end-user function at all. Unfortunately, even with these Windows databases, it's not as easy as you might like.

Take Lotus's Approach as an example. Overall, testers gave it mostly favorable ratings. Moving fields around the form, for example, posed no problem. But when testers went to create the drop-down list box our test required, they consistently complained that the commands for creating one were hard to find.

SUMMARY	Access	Approach	dBASE	FoxPro	Paradox
Satisfaction	Good as Approach.	Testers were happy with the results.	Too frustrating to talk about.	Fussy but fun.	Hated it.
Productivity	Not great.	Good results fast.	Most testers weren't productive.	It just takes too long.	A difficult task to finish.
Help System	Should learn from FoxPro.	Nothing to write home about.	Help system needs work.	Once again, good help.	Help system doesn't.
Summary	★★½	★★★	★	★★½	★

*****Excellent **** Good *** Acceptable ** Poor * Unacceptable*
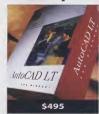
The success of AutoCAD has inspired dozens of cheap imitations.

If you need a CAD package but don't need all the sophistication of AutoCAD® software, don't settle for a cheap imitation. Get new AutoCAD® LT for Windows.™ Unlike those "bargain" packages, it's based on the world standard—AutoCAD—and gives you features the others can't duplicate. Like more accurate 2D drawing tools for designing

And one inexpensive one.

discrete parts. 3D design and layout tools and full support for layers and blocks. And drawings you can link, so changes on the master are automatically reflected in other drawings. What's more, making these drawings is as easy as using a few simple icons and tools. But if you do find

yourself with a question, you'll have access to on-line help as well as free 90-day product support. And since AutoCAD LT reads and writes data just like AutoCAD software, your work will be compatible with over a million AutoCAD users worldwide. Chances are your clients and colleagues are among them. So beware of cheap imitations. Visit your Authorized AutoCAD Dealer or leading retail software store. Or, for a free demo disk, call 1-800-228-3601 and ask us for Demopack A217. Outside the U.S. and Canada, fax 415-491-8311.

$495

⬥ Autodesk.

The Most Usable Database

PC USABILITY Tested

There are times when usability testing confirms conventional wisdom, and times when it turns it on its ear. During our database testing, we had both. Conventional wisdom says that end users want to avoid programming, so it makes sense that Lotus's Approach should win. But who would have thought that power users want to avoid a programming language, too? Approach and Access provided a solid one-two punch, ranking highest with all users.

PC USABILITY Approved

Approach: The not-surprising usability winner with end users and the surprise winner among power users. There's a lot to be said for a database lauded as being "very simple." An application with these results is bound to boost productivity. ★ ★ ★ ★

Access: Because of the wonderful Wiz it has, Access snagged second place in our usability testing for both end users and power users. Testers say it's "easy" to do most anything with Access. ★ ★ ★ ⅓

SATISFACTION: *It was an incredibly close race among the top three contenders—all three earned acceptable ratings on average— three stars. Borland's products were runners-up here.*

PRODUCTIVITY: *Lotus's Approach stepped out in front as the database that both end users and power users were most productive using. Microsoft's FoxPro and Access tied for second.*

HELP SYSTEM: *Approach slipped to third as Microsoft's Access Wizards and online help pushed it into first place, while FoxPro garnered compliments for its documentation.*

SUMMARY: *Lotus's Approach—with its point-and-click, no-programming interface—proved the most usable database of those we tested. Microsoft's Access was a solid performer too.*

Lab Notes: What Testers Said about Windows Databases

Lotus Approach

"Creating a form was a simple as choosing the 'create' drop-down menu, selecting form, and following the prompts."
CATALOGER

Borland dBASE

"Performing a query on data was relatively simple, but doing indexes or creating a report . . . was very complex and difficult to complete."
TECHNICAL SUPPORT SPECIALIST

Microsoft FoxPro

"I found [creating a new table] to be very easy—the Wizards were very functional."
TECHNICAL SUPPORT ENGINEER

How We Scored
For every usability-tested product, a script is designed consisting of a set of common business tasks. We report test results in three key areas: user satisfaction, productivity, and help. The satisfaction score reflects users' preferences on a scale of one to five (five is best). The productivity score reflects the percentage of tasks completed, and the help score reflects how much the documentation and online help actually helped testers.

How We Tested
To evaluate the five most popular Windows databases, we brought two types of users into our Usability Labs: end users

SCORECARD APPROACH **RUNS AROUND** THE OTHER DATABASES

Factor (all weighted equally)	Access	Approach	dBASE	FoxPro	Paradox

The Most Usable Database

PC USABILITY Tested

There are times when usability testing confirms conventional wisdom, and times when it turns it on its ear. During our database testing, we had both. Conventional wisdom says that end users want to avoid programming, so it makes sense that Lotus's Approach should win. But who would have thought that power users want to avoid a programming language, too? Approach and Access provided a solid one-two punch, ranking highest with all users.

Prospect Information

COMPANY	CONTACT NAME
AB Distributors	David Wilson
ADDRESS	SALUTATION
431 N Main St	Mr. Wil
CITY	ST/PROV	ZIP/POSTAL
Pensacola	FL	90122

Contact Notes

DATE	NOTES
3/20/92	Ordered 100 hang gliders

NO POSTAGE
NECESSARY
IF MAILED
IN THE
UNITED STATES

BUSINESS REPLY MAIL
FIRST CLASS MAIL   PERMIT NO. 66   BOULDER, CO

POSTAGE WILL BE PAID BY ADDRESSEE

PCComputing

P.O. Box 50253
Boulder, CO 80321-0253

Lab Notes: What Testers Said about Windows Databases

Lotus Approach

Step 1: Layout   Step 2: Fields

Step 2: Select and add fields for the view.

Database fields:
CONTACT
TITLE
FIRST_NAME
LAST_NAME
POSITION
COMPANY_NA
ADDRESS
ZIP
TYPE

>> Add >>

Cancel

"Creating a form was a simple as choosing the 'create' drop-down menu, selecting form, and following the prompts."
CATALOGER

Borland dBASE

Navigator
Current Directory: C:\DBASE\WN\SAMPLES

"Performing a query on data was relatively simple, but doing indexes or creating a report . . . was very complex and difficult to complete."
TECHNICAL SUPPORT SPECIALIST

Microsoft FoxPro

Table Wizard

By which fiel records?

Select each and click the 3 fields.]

Available Fields:
AccountID
AccountNum
AcctType
StartDate
Taxable

Add
Remove
Ascendi
Descen

"I found [creating a new table] to be very easy—the Wizards were very functional."
TECHNICAL SUPPORT ENGINEER

How We Scored

For every usability-tested product, a script is designed consisting of a set of common business tasks. We report test results in three key areas: user satisfaction, productivity, and help. The satisfaction score reflects users' preferences on a scale of one to five (five is best). The productivity score reflects the percentage of tasks completed, and the help score reflects how much the documentation and online help actually helped testers.

How We Tested

To evaluate the five most popular Windows databases, we brought two types of users into our Usability Labs: end users and experienced power users. All had used at least one of the products we were testing. We urged testers to think out loud. Some of their "thoughts" appear in the article. Each user was given the same assignments—five for the end users, six for the power users—which took about ten hours to complete.

How to Contact

Access / Microsoft / (800) 426-9400 / $329 est. street price / *Reader Service No. 666*

Approach / Lotus / (800) 343-5414 / $80 est. street price / *Reader Service No. 667*

dBASE for Windows / Borland Int'l. / (800) 233-2444 / $329 est. street price / *Reader Service No. 668*

FoxPro / Microsoft / (800) 426-9400 / $293 est. street price / *Reader Service No. 669*

Paradox / Borland Int'l. / (800) 233-2444 / $339 est. street price / *Reader Service No. 670*

SCORECARD — APPROACH **RUNS AROUND** THE OTHER DATABASES

Factor (all weighted equally)	Access	Approach	dBASE	FoxPro	Paradox
1. Arranging Tables	★★★★ Wizards are the key here.	★★★½ A simple operation.	★★★★ Its highest marks.	★★★★½ FoxPro stands alone.	★★★★ Paradox's strong suit.
2. Importing Data	★★★½ Stumble and fall.	★★★★★½ Match your columns.	★★½ This doesn't look good.	★★ You may never see your data.	★★★★ Hard even if you use Paradox.
3. Creating Forms	★★★½ Paint-by-the-numbers ease.	★★★½ Michelangelo results.	★★★ An adequate designer.	★★★ Good enough for the job.	★★★½ Drag-and-drop simplicity.
4. Building Queries	★★★ Easy to do.	★★★★ Just click, check, and go.	★★★ OK if you can figure out how.	★★★★½ Automation is easy.	★★½ Testers called it a "nightmare."
5. Compiling Reports	★★★ Use the Wizards.	★★★ Fairly easy, said testers.	★★½ Poorly documented.	★★★½ Doing math can be hard.	★★ Far too complicated.
6. Constructing Custom Controls	★★½ Hard to add drop-down boxes.	★★★ It'll be the way you want it.	★ This is very disappointing.	★★★½ Fussy, but it works.	★ Chances of getting it to work are low.
Verdict *100%*	★★★★½	★★★★	★★★	★★★	★★½

★★★★★ *Excellent*   ★★★★ *Good*   ★★★ *Acceptable*   ★★ *Poor*   ★ *Unacceptable*

In **Expert** Hands

When somebody's trying to sell you a database, they make it sound so easy to use. Have you ever wanted to say, "If it's so easy, you do it"? We have, and we did.

Evaluating the reactions of end users and power users to Windows databases is one way to find out how useful they are. But we wanted to see what happens when certified database experts sit down with one of these packages for a day. So we invited some in for a crash test. The analogy: We wanted to gauge what you could expect when your employees get really good at their chosen database.

We asked Borland, Lotus, and Microsoft each to provide us with a developer for their applications for one day (Microsoft's FoxPro team begged off, citing the impending release of Visual FoxPro 3.0). We supplied each developer with a database design and then left them alone for eight hours (naturally, you

should plan on more). Their challenge: to build a contact-management application that included tables, data entry screens, and query and report capabilities. We set up each developer with a Pentium system with the latest version of the database already installed.

The results were impressive for the short amount of time we provided. Although not all of the features we'd requested were there, all the applications ran and looked good. This is great news for anyone who wants to build a quick representation of an application and submit it to the user base for input and suggestions before it reaches final development stages.

Here's a look at each of the four contenders, in no particular order. We weren't looking for winners or losers in this test.

Lotus boasts that the average user will make real

Paradox: We liked the clean interface that Borland's developer came up with.

Access: Microsoft's developer finished the tables for our challenge in just 40 minutes.

It's 3:50 pm. You've just finished the final revision to the sales plan. Then the phone rings. "We're sending over 10 new pages of competitive info." Click. Good thing they lock the windows on this floor. You have to get it into the plan by the end of the day. What now?

You think she's finishing the proposal. She thinks you are. Surprise, neither one of you is. And it's 4 hours before the grant committee meets. Let's see, 16 new pages of data, 11 article reviews, 3,600 words sent by your partners in Istanbul. Who can type faster? What now?

progress within two hours of opening the Approach box. Based on what the developer did, we believe it. The Approach application showed how easy it was to create forms that take advantage of either the function keys or the mouse. Built-in templates—incorporating fields for contacts, companies, employees, and products—made it easy to create the tables we asked for, which shows Lotus has done its homework in anticipating what users might need.

The same held true for the Access developer, who—thanks to the built-in Table Wizard—had all the tables for the application created within the first 30 minutes. The graphical view of the tables and links sped up the development of the interface, which can be the time-consuming bottleneck for many products. We found that because Access stores all the database files—forms, queries, tables, and more—in one master file, we didn't have to worry about file management anymore.

Borland sent us two experts, one each for

Approach: Lotus's developer created an application that can be easily driven by function keys.

Paradox and dBASE. The Paradox developer came up with a clean and intuitive interface for his contribution. And while he deserves most of the credit, some recognition should go to the built-in Forms Expert and the new Project Viewer file-management interface. The power of ObjectPAL, Paradox's object-oriented development language, also showed in the application's nicely consistent data-formatting and help screens.

What does Borland's dBASE have that all the others don't? A huge installed base of developers, which means it may be easier to find the expert you're looking for. Our dBASE developer liked the option of switching modes and getting to the much-beloved dot prompt. Most impressive in the dBASE application: the easy-to-use search window.

All four of the databases used in our challenge provide powerful, easy-to-use tools. In the right hands, they can quickly deliver a fully functioning application that will give you quick access to the data you need.   **ADAM MEYERSON**

dBASE: With its easy-to-use search window, we brought up the contact information easily.
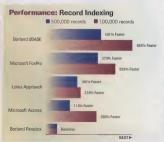
Engines Roaring

In addition to the usability testing we conducted on the five Windows databases in our own Usability Labs, we sent the products to ZD Labs for performance testing. All products were tested on identically configured test benches. We first imported data from ProPhone, a listing of California telephone numbers. We imported records numbering 10,000; 50,000; 100,000; and 500,000, and timed the process. Next, we

created an index of data using one field, then two fields, and measured the time it took. We then timed queries and different output formats (screen, printer, and files). Not surprisingly, the runaway winner in the query test was Microsoft's FoxPro, thanks to its Rushmore engine technology. Lotus's Approach, our usability winner, didn't top any of the performance tests.

Performance: Load Times

■ 500,000 records ■ 100,000 records

Borland dBASE	990% Faster / 767% Faster
Borland Paradox	865% Faster / 777% Faster
Microsoft FoxPro	799% Faster / 677% Faster
Lotus Approach	409% Faster / 312% Faster
Microsoft Access	Baseline

BEST ▶
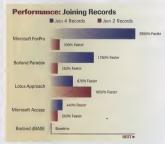
Flip-flop: Usability doesn't necessarily equate with performance. The easiest packages took longest to load.

Performance: Query

Microsoft FoxPro	1,141% Faster
Microsoft Access	767% Faster
Borland Paradox	648% Faster
Lotus Approach	183% Faster
Borland dBASE	Baseline

BEST ▶

Braving the Elements: In a query of 10,000 elements, FoxPro's Rushmore engine technology gave a big boost.

Performance: Record Indexing

■ 500,000 records ■ 100,000 records

Borland dBASE	401% Faster / 685% Faster
Microsoft FoxPro	373% Faster / 533% Faster
Lotus Approach	186% Faster / 215% Faster
Microsoft Access	113% Faster / 360% Faster
Borland Paradox	Baseline

BEST ▶

Juggling Act: For sorting data into indexes, Borland was on top–and bottom–no matter how many records.

Performance: Joining Records

■ Join 4 Records ■ Join 2 Records

Microsoft FoxPro	3500% Faster / 330% Faster
Borland Paradox	1750% Faster / 253% Faster
Lotus Approach	875% Faster / 1650% Faster
Microsoft Access	440% Faster / 253% Faster
Borland dBASE	Baseline

BEST ▶

Join Venture: Combining indexed records showed no clear winners; dBASE brought up the rear, though.

Tolstoy **became infuriated whenever asked to edit or revise his work. Reminds us of someone using our competitors' flow charting software.**

Leo Tolstoy had a standard reaction to editors' revisions: unbridled rage. And we can hardly blame him since we all know what a pain revising and editing can be – especially if it's a complex flow chart you're working on. That's the beauty of new allCLEAR III™ for Windows. Whether your changes are minor or major, now you can drag and drop complete flow chart structures like two-way decision points or multiple choices anywhere you like. And, unlike Visio™ or ABC FlowCharter™,

Choose from over 180 shapes, and dozens of different diagram and line styles, colors and fonts

allCLEAR III intelligently redraws and aligns every step in your chart for you.

Creating charts and diagrams from scratch is also radically faster and easier. You can use the handy drag and drop templates, or create entire flow charts simply by describing your process in plain English. And allCLEAR III even inserts page breaks automatically at the most logical points.

So visit your nearest dealer today, or call 800-338-1759 to order allCLEAR III. And the next time you need to change a flow chart, you'll be a lot less cranky.

allCLEAR
IT DRAWS FLOW CHARTS FOR YOU!

It's All **Relational**

Overall, our testers rated Lotus's Approach the most usable Windows relational database, but it's not necessarily the best database for everyone. Microsoft's Access was a close second. For your particular needs, one of the other databases might be better.

Who offers the best query performance? If speed of accessing data is your main consideration, turn to Microsoft's FoxPro, which outperformed all of the other databases by a healthy margin in overall query performance. Surprisingly, although Microsoft's Access is built on the same basic database engine as FoxPro, its performance is notably slower in queries.

Who offers the best performance overall? The answer is slightly different here: Borland's Paradox can delete records much more quickly than even FoxPro, so when it comes to the aggregate speed in doing all sorts of database operations, Paradox is the winner.

Who offers the best programming language? Choosing a programming language is highly subjective, so we won't try to answer that. But Access's Basic-like development language is certainly

easy to learn. If you're familiar with the xBASE programming language, you'll probably be most at home with dBASE for Windows or FoxPro. The most potentially powerful programming language is Paradox's ObjectPAL, but its syntax can be a bit daunting.

Who offers the best access into SQL databases? They all support Open Database Connectivity (ODBC), the de facto (if somewhat pokey) standard for gaining access into larger databases. Most offer direct support for enterprise databases such as Oracle and IBM's ever-popular DB2.

Beyond the issues of usability and performance, these Windows databases share many of the same features, thanks to competitive pressures. When choosing one, then, you need to take into account who'll be using it the most. For instance, do you have a backlog of applications that your developers have to attack now? Or is end-user productivity dwindling because of a confusing application that needs to be revamped? Whatever the answer, these departmental databases can help you confront the congestion.

DECISION MAKER — WHAT'S THE BEST **WINDOWS DATABASE** FOR YOUR BUSINESS?

1 Choose the factor that's most important.   **2** Choose the next most important factor.   **3** What else is important?   **4** For your needs, the best product to buy is . . .

1	2	3	4
Ease of Querying Data	**Ease of Generating Reports**	Application Development Tools	Lotus Approach
		Performance	Microsoft FoxPro
	Performance	Application Development Tools	Microsoft FoxPro
		Ease of Generating Reports	Lotus Approach
Ease of Generating Reports	**Ease of Querying Data**	Application Development Tools	Lotus Approach
		Performance	Microsoft Access
	Performance	Application Development Tools	Microsoft Access
		Ease of Querying Data	Lotus Approach
Performance	**Ease of Querying Data**	Application Development Tools	Microsoft FoxPro
		Ease of Generating Reports	Microsoft Access
	Ease of Generating Reports	Application Development Tools	Microsoft Access
		Ease of Querying Data	Microsoft Access

CompUSA and Pentium™ Processors: Powerful business partners.

CompUSA has been providing computer solutions to businesses since 1984. Today, over 70,000 companies turn to CompUSA for their computer needs. We carry over 5000 products, and we know that product availability is important to you. So when we say you'll have it, you will. And with 83 stores nationwide, chances are we're close to your business. As a corporate customer, you'll be assigned your own account representative who will ensure that you receive fast, competent service and technical support. CompUSA's corporate credit card and business leasing options make buying easy. CompUSA puts the power of the nation's largest Computer Superstore behind your business.

To get in touch with a CompUSA account representative, find the CompUSA location nearest you, place an order or receive a free catalog, call today. For International Sales call **1-214-888-5770**. Government Sales 1-800-468-4682 (GSA #: GS00K94AGS6319).

Guaranteed Low Prices

Knowledgeable Salespeople

Corporate Training

Service Plan

Technical Support

1-800-COMP USA

COMP USA CORPORATE
The power behind American business.

Circle 190 on reader service card.

5457-3-95

PCC0395

The Translation.

©1994 Alpha Software Corporation, Inc. All computer and product names are trademarks and registered trademarks of their respective owners.

invoices, and creating stunning reports — all with incredible ease. ✍ There are even pop-up Genies to walk you through finding, sorting and analyzing data from new or existing files. And if you do happen to be a programmer, we've included a powerful programming language called Xbasic." ✍ So visit your local reseller today, or you can call us for more information at 800-441-ALPHA. And choose the database that really and truly is both powerful and easy-to-use. ✍ And that's not just a load of, um, baloney.

Alpha Five
For Windows
The Powerful Database Anyone Can Use.

The Mother of All
Upgrades

SYNOPSIS

THE SOFTWARE: *Everyone's doing Windows 95. Here's the lowdown on upgrades to suites, utilities, and applications.* **180**

THE INTERFACE: *The new wave of apps gets a usability boost from the consistent Windows 95 interface.* **182**

THE HARDWARE: *As anyone who has struggled with a sound board can testify, even a little Plug and Play is a very good thing.* **184**

FINAL ANALYSIS: *The who, what, and when of 30 top Windows 95 upgrades.* **186**

How much will it *really* cost to upgrade your office to Windows 95? Don't answer too quickly. Yes, you'll have to spend more than you planned, but probably not for the reasons you thought. In relative terms, the cost of the new operating system itself is a mere pittance. You won't need to invest in all-new hardware, either, although a few extra megabytes of RAM on older PCs won't hurt. And after the first round of orientation sessions, your training and support bills may actually go *down*.

But if your company's PCs are stuffed with software—and these days it's rare to find a Windows PC with fewer than ten applications on the hard disk—get ready for a tidal wave of upgrades for at least $49 per product. Of course, old 16-bit applications *will* run under Windows 95, but without the added 32-bit features. If your budget doesn't have enough zeroes on the software upgrade line, it's time for a heart-to-heart talk with the C.F.O.

PC Computing surveyed more than 90 top software developers to get the lowdown on their plans for Windows 95. We also looked at the first wave of Plug-and-Play peripherals, some of which are already available, to see how they will combine with the applications to change the way we work.

Every major software vendor we talked to told us that releasing a Windows 95 version is at the top of this year's to-do list. Most have committed to aggressive delivery schedules, which means you can expect to see 32-bit versions of most of the mainstream business applications you already use within 90 days of Windows 95's release.
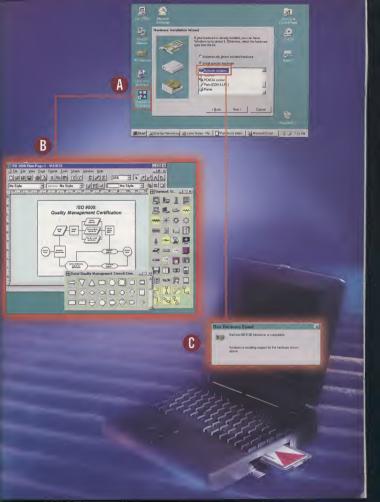
Even if you take advantage of every cut-rate offer available, it works out to a lot of upgrade dollars, so our survey also asked what kind of return you can expect on your upgrade investment. Most application developers told us it's still too early to divulge details of new features, but they all agree on one thing: Windows 95 will usher in the Year of the Upgrade.

A JUMP START: You can do it all from the Windows 95 desktop.

B LAUNCH PAD: From this starting point, you can launch 32-bit applications like Shapeware's Visio. The payoff includes filenames that make sense and a consistent, up-to-date look.

C SMOOTH SAILING: The desktop is also the message center when you want to configure a new piece of hardware, such as an ethernet adapter card for a notebook. And Windows 95's hardware wizard handles the hard work of installation.

BY ED BOTT AND YAEL LI-RON

Apps under Construction

Windows 95 is scheduled to arrive before the end of August, which means that anyone in the state of Washington who can speak C++ is already working around the clock. But this is no remake of *Sleepless in Seattle*. They're also working the late shift in Cambridge, Orem, Cupertino, and Atlanta.

According to our survey, 30 percent of the leading software makers plan to ship their next versions no later than the day Windows 95 arrives. More than 70 percent say their new versions will be on store shelves within 90 days after the new operating system is ready. Here's what you can expect from the first wave of applications.

The Suite Story The most eagerly awaited upgrades are the biggest ones: the all-in-one software suites from Lotus Development, Microsoft, and WordPerfect.

Expect a major upgrade to Microsoft Office, whose core applications, Word 6.0 and Excel 5.0, have already shipped in 32-bit versions that run on Windows NT and will run on Windows 95. Look for Microsoft to continue its push to standardize the interface of all Office applications beyond the simple

menu-and-toolbar level. And look for the new Office to be available fewer than 90 days after Windows 95 appears.

Like its cross-country rival, Lotus will use this upgrade to polish its SmartSuite interface and add major features, especially to the oldest member of the family, Ami Pro. Details of those features and when you'll see them in shrink-wrap are tightly guarded secrets—but you'll get short odds if you bet that the new SmartSuite will appear before the new Microsoft Office.

WordPerfect, which just delivered the first version of PerfectOffice last November, is poised to turn around a Windows 95 version before the end of 1995. It's most likely that WordPerfect will concentrate on porting its flagship word processor to 32-bit code. Don't expect a slew of new features.

Utility Players The day you install Windows 95, your favorite utilities will probably stop working. The long filenames and extended attributes in the Windows 95 file system make upgrades mandatory. Symantec has already promised that a new 32-bit, fully graphical version of the Norton Utilities will arrive the same

day Windows 95 does. New versions of Norton AntiVirus are also due.

Other driver-level utilities are due for updates as well. Stac Electronics has a new 32-bit version of Stacker in the pipeline, McAfee is planning a free Windows 95 upgrade to VirusScan within 90 days of Windows 95, and even Helix Software's NetRoom memory manager has a future after Windows 95.

The Windows shell game is a little more confusing. It's unlikely that anyone will replace the complex Windows 95 shell; instead, Symantec is likely to update pieces of Norton Desktop and Central Point Software's PC Tools for Windows, like the first-rate Central Point File Manager, for the new era.

Other Eagerly Awaited Apps What are the other best-selling application vendors planning? Datastorm isn't talking about ProComm Plus, but NCSA Mosaic is in great shape. AutoDesk is unwilling to comment on what its AutoCAD plans are. Where does your favorite application fit in? See "The Shape of Software: 30 Apps Worth Waiting For," page 186, for the inside story. Oh, yes, Doom for Windows 95 will be available immediately.

NEW LOOK AND FEEL: With consistent SmartIcons, menus, InfoBoxes, and the LotusScript development language, Lotus is betting that it can deliver the most tightly integrated suite for Windows 95. The final release may look dramatically different from this early Freelance Graphics demo.

ALMOST PERFECT? The centerpiece of PerfectOffice should be faster and smarter, thanks to multithreading in printing, spell-checking, and other subsystems. This pre-alpha version wouldn't qualify for the Windows 95 logo, though—the long filename should appear first in the title bar.

The first wave of Windows 95 applications should run faster and more reliably, thanks to the muscle of **32-bit code.** You'll see fewer "Out of memory" messages because Windows 95 handles **system resources** more intelligently. And Windows 95's document-centric approach takes advantage of the ubiquitous **OLE 2.0.** If you couldn't stand OLE's herky-jerky performance and endless error messages under Windows 3.1, get ready to take another look: OLE finally begins to deliver on its potential under Windows 95. **Mail and communications services** are built into the operating system, making it possible for any application to extend its reach far beyond the desktop.

32-bit Blast

Excel 5.0 Recalc Speed

43% Faster

32-BIT EXCEL ON WINDOWS 95, BETA 2

Baseline

16-BIT EXCEL ON WINDOWS FOR WORKGROUPS

NOTE: PERFORMANCE MEASURED USING RECALC-INTENSIVE STOCK-PRICE MACRO

32-bit Code: If you see the Windows 95 logo on a new application, you can bet it's 32 bits from top to bottom. The payoff? Less swapping of memory and speedier performance, especially in CPU-intensive operations like recalculating a spreadsheet.

System Resources: Some Windows 3.1 applications developed a nasty reputation for chewing up system resources and refusing to give them back, even after you quit. For all practical purposes, Windows 95 removes those barriers.

OLE 2.0: Under Windows 3.1, data sharing is a hit-or-miss proposition because of OLE's huge resource requirements and slow performance. The 32-bit OLE engine in Windows 95 is vastly improved, and our survey showed enthusiastic support for OLE in the next generation of Windows applications.

Mail and Communications Services: Look for simple Send Mail commands on the File menus of business-oriented applications. And the Windows 95 Telephony Application Program Interface (TAPI) will usher in a revolution in communications software. TAPI handles the dirty work of configuring modems, setting up dialing options, and managing COM ports.

DRAG AND DROP 95: For the past two years, Visio has been the official poster child for OLE 2.0. The 32-bit version, which should appear simultaneously with Windows 95, will be tightly integrated with the new Windows shell. In the spirit of OLE, stencil palettes can "float" anywhere on the desktop.

PAGING DR. NORTON: A lost file is a lost file, whether it disappears 16 or 32 bits at a time. Look for the Windows 95 version of the Norton Utilities—including an updated Norton Disk Doctor and a comprehensive System Doctor—to be available the same day that Windows 95 hits the streets.

New **Look** for the Next Wave

Will your next software upgrade pass the Windows 95 test? If you see the Windows 95 logo on the box, you can bet it will. Before a software vendor can earn Microsoft's blessing to use the new logo, the upgrade has to run an eight-point gauntlet covering the basics of the new interface.

All but two of the software companies that responded to our Windows 95 survey told us they expect their new releases to pass the test with flying colors. That remarkable display of solidarity is testimony to the selling power of the new logo; it's also a tribute to the usability benefits of the new interface.

The new one-click Minimize, Maximize, and Close buttons are part of a strategy to virtually eliminate double-clicking. Other consistent elements you can expect to see at nearly every turn include the Explorer, a chameleon-like file-management tool, and shortcut menus that pop up with a right-click for instant access to common commands.

What's inside the new user interface? And what can you expect to find inside your upgraded applications when you see the Windows 95 logo on the box? Here's a partial list.

It's a Document-Centric World
The architects of Windows 95 want you to stop thinking of the program that created a document and simply think of the document itself. Support for long filenames is a must, and to manage those files you'll use the new common dialog boxes that appear in response to File Open and File Save commands.

One of the most subtle indications of the shift to a document-centric world appears in the title bar, where the new style guidelines dictate that the name of the document must appear first, followed by the name of the program that created it.

If the document's extension is registered, the Windows 95 default is to hide the extension, and Windows 95–compatible applications have to do that as well, in the shell, in title bars and dialog boxes, and with icons.

Use an INI File, Go to Jail? There's no ambiguity in the Windows 95 application guidelines: Your preferences must be stored in the Registry, a more-or-less central store that theoretically allows you to log in from any workstation, anywhere on the network, and see your familiar desktop.

Any software developer that uses INI files instead of the Registry does not pass Go, and it most certainly does not collect the Windows logo.

The guidelines are also clear when it comes to removing an application. Windows 95 includes a Control Panel applet that lets you uninstall an application and clean up the Registry.

The Rest of the Test Document-centricity is a baby step on the road to compound documents that consist of data from everywhere, so it's not surprising that support for object linking and embedding (OLE 2.0) is also on the mandatory list. You can expect your Windows 95 applications to recognize universal naming convention filenames—prefaced by server names rather than drive letters. And every File menu must have at least simple Send Mail capability.

Other elements in the Windows 95 style guidelines are strongly recommended but not mandatory, and the rules for utilities, development tools, and games are slightly relaxed. With those notable exceptions, you can expect the first wave of Windows 95 software to be remarkably consistent.

CASTING A WIDER NET: Redoing NCSA Mosaic for Windows 95 was a snap, say its developers, because the program was already written in 32-bit code. The de facto standard for navigating the World Wide Web should be easier to set up with the built-in TCP/IP support of Windows 95.

CALLING ALL MESSAGES: Telephony in Windows 95 brings voice messaging capabilities to Delrina's WinFax Pro. Need to edit WAV files or record conversations or memos? They're just a button click away. And an integrated log lets you manage voice mail, e-mail, and faxes.

NCSA Mosaic Flavors

If the "flying Windows" logo is on the box, it means that the application follows Microsoft's user-interface style guidelines, including support for long filenames and use of the new **common dialog boxes** for opening and saving files (below). Other user-interface features that are either mandatory or strongly recommended under the logo program: extended **property sheets** that store custom file information, **shortcut menus** that pop up with a single right-click, and preferences that are saved in the **Registry** rather than in countless INI files.

Designed for

Microsoft®
Windows™ 95

Common Dialog Boxes: The new File Open and Save dialog boxes let you right-click on any file or drive icon to add a new folder, delete or rename an existing file, or quickly view a file's contents. These common dialog boxes are a variation of the Explorer, which appears throughout Windows 95.

Property Sheets: Any application can register a file type and add its own tabbed pages to the properties for the files it creates. For example, summary information added to Microsoft Word and Excel documents shows up when you right-click on the file.

Shortcut Menus: Context-sensitive menus that pop up with a single right-click are "strongly recommended" under the interface guidelines. Our prediction: Most applications will support the new menus.

Registry: Preserving the configuration of your Windows 3.1 applications can be a nightmare, with stray bits of information deposited in WIN.INI, SYSTEM.INI, and private INI files. Well-behaved Windows 95 applications write this information to the Registry instead: In addition to easier uninstallation, it gives network users the ability to preserve their preferences even if they log in from another workstation.

INSIDE INFORMATION: Windows 95's Quick View utility lets you inspect the contents of a file by right-clicking on its icon, but you can't do anything with the data. Want Clipboard and printer support? Look for Systems Compatibility Corp.'s low-cost upgrade, called Quick View Plus.

FROM C TO SHINING C: Borland's C++ (bottom) and Microsoft's Visual C++ (top) let developers crank out 32-bit Windows 95 applications in record time. Borland lets developers use the same code base for 16- and 32-bit versions, while Microsoft's Wizard adds instant OLE support.

Plug and Play: The Lego Approach to Upgrades

Hardware on **Easy** Street

Jumpers, dip switches, IRQ conflicts, and the dreaded CONFIG.SYS. This is the stuff that nightmares—and Apple commercials—are made of. So what if you woke up one day and discovered it had all been just a bad dream? That you could plug in a printer, sound board, CD-ROM drive, or PC Card and it would literally configure itself? Only a dreamer would say that that day and Play will work perfectly every time, but our early experience has been positive.

Desktop Systems Plug and Play's real power is its ability to automatically configure a device. If you've ever had to set jumpers or dip switches to resolve IRQ conflicts, this one's for you: True Plug-and-Play devices don't use jumpers. Windows 95 will reset the DMA, base memory address, even IRQ settings. Current offerings of Plug-and-Play boards include Future Domain's PNP-1630 (an ISA SCSI controller), Media Vision's Pro 3-D sound card, and Advanced Micro Devices' PCnet-ISA+, a no-fuss ethernet card.

Portables A Plug-and-Play BIOS means a dramatic new way to work with mobile computers. Say your docking station provides the connection to

your network. Without Plug and Play, when you remove the notebook from the docking station, you first have to save your work, then put the system in "sleep" mode. When you power it on again, you need to reconfigure the system so that it doesn't look for the network. When you plug it back in, you have to reconnect to the network.

The scenario is simpler with a Plug-and-Play notebook: When you press the Eject button on the docking station, the BIOS alerts the operating system that you're about to disconnect; the operating system informs your open application, and you see a dialog box asking if you want to save first. Next, the system unloads the unnecessary network driver and gracefully breaks the network connection. Plug the notebook back in, and the network driver reloads automatically, then reestablishes the network connection. Some notebooks that have the SystemSoft Plug-and-Play BIOS are Hewlett-Packard's Omni-Book 600PC and 4000PC, and Digital Equipment Corp.'s HiNote and HiNote Ultra. Using the same principle, you can also print a document when you're on the road, away from your

printer. The operating system will graciously defer the print job until you plug the notebook back in to the docking station, at which point it'll start printing automatically.

Peripherals A few devices, available today, will change the way you work. For instance, when you insert a PC Card into a socket, the system auto-senses it, informs you that a new device is in place, then configures itself and informs running applications of the new presence. Some of the PC Cards already available are 3Com's EtherLink III net adapter, Xircom's CreditCard Ethernet+Modem II, and Maxtor's MobileMax Type III hard drive, which provides 262MB of storage in a single slot.

With a bidirectional parallel port, your Plug-and-Play printer (such as any member of HP's LaserJet 4 family), can easily communicate with your system. Two Plug-and-Play mice are already available: Logitech's Mouse-Man Sensa and the Microsoft Mouse. Add a Plug-and-Play monitor, such as one from NEC's MultiSync XP line, and Windows 95 will identify it—resolution, refresh rate, and all.

INSTANT RECOGNITION: Add a new device to your system—in this case, a network adapter in the PC Card format—and Windows 95 senses the change and loads appropriate drivers. Remove the device, and the drivers are dynamically unloaded to free up memory for applications.

DO IT YOURSELF: What if Windows 95 doesn't recognize a new device? Configure it manually using the Hardware Installation Wizard. Pick from built-in lists or add a new device using drivers on a floppy disk. If it's not a Plug-and-Play device, you may have to deal with IRQs and the like.

New Hardware Found

NatSemi NE4100 Infomover or compatible

Windows is installing support for the hardware shown above.

Hardware Installation Wizard

Click the manufacturer and model of your hardware. If your hardware is not listed, or if you have an installation disk, click Have Disk.

If your hardware is still not listed, click Back, and then select a different hardware type. To see all hardware choices, click Unknown Hardware.

Manufacturers:
Creative Labs
DSP Group
ESS Technologies, Inc.
Generic multimedia drivers
Intel
Media Vision
Microsoft

Models:
Media Vision Pro Audio 3D
Media Vision Pro Audio Spectrum
Media Vision Pro Audio Spectrum 16
Media Vision Pro Audio Spectrum with Thunder
Media Vision Pro Audio Spectrum with Trantor SCSI
Media Vision Pro Audio Spectrum with Trantor SCSI ser

Have Disk

< Back   Next >   Cancel

A complete Plug-and-Play system includes four components: a new **BIOS,** which acts as mediator between hardware, operating system, and applications; the **operating system,** of which Windows 95 is only the first one; jumperless, switch-free, software-configurable Plug-and-Play **peripherals,** which make installation, configuration, and hot-swapping easier; and upgraded **applications,** which can respond appropriately to system events. Even with an old BIOS and so-called legacy hardware, you still can see a payoff from Plug and Play, because many of its benefits come straight from the operating system.
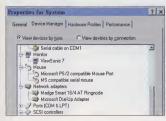
BIOS: For notebooks with docking stations, a Plug-and-Play BIOS lets you dock and undock at will, reestablishing connections to networks and desktop devices on the fly without requiring that you hit the suspend switch or reboot.

Operating System: Apple fans can argue that the Mac is the original plug-and-play platform, but Windows 95 is the first true Plug-and-Play operating system for the PC. The key is Windows 95's capability to maintain a central database of all hardware installed, even if it's not currently available.

Peripherals: Not all Plug-and-Play devices are created equal. The ideal peripheral is a SCSI adapter, network interface, or sound card whose resources can be reassigned from the Control Panel. Many non–Plug-and-Play boards can be identified by the operating system, but their configuration depends on jumpers or dip switches.

Applications: Plug-and-Play–aware applications are one notch smarter than the average application. A Plug-and-Play–aware application can work with Windows 95 to deal intelligently with configuration changes—for example, by asking whether you want to save an open file to the network server before your notebook's network connection disappears.

CENTRAL MANAGEMENT: Want an inventory of all the hardware in a given system? The System Device Manager is the window into the Registry's collection of hardware-related information. The bright-red X means the second mouse driver is installed but not currently active.

NATURAL RESOURCES: Windows 95 handles resources more intelligently than DOS or earlier versions of Windows ever did. The Resources tab on each device's properties sheet identifies IRQs used, DMA settings, and I/O addresses. Conflicts show up in the box at the bottom of the dialog box.

Apps **Everywhere**

We tried. We looked everywhere to find a major software developer that wasn't aggressively working on a Windows 95 version. We contacted more than 90 vendors and got the same response: We'll be there.

Some big names, like Intuit and Aldus, acknowledge that their Windows 95 development is under way, but they're keeping their plans well cloaked. Others, including several Microsoft divisions, and the makers of such utilities like Metz Software's Task

Manager and ElseWare's FontWorks, confirm their development plans but don't provide enough information about new features to earn a place in this table.

But even at this early stage, the conclusion is inescapable: Within a few months of Windows 95's release, there will be hundreds of mainstream applications rewritten in 32-bit code and fully integrated with the new interface. When Windows 95 finally arrives, it will kick off the Year of the Upgrade.

The Shape of Software: 30 Apps Worth Waiting For

Company and Product	What's New?	Plug and Play	OLE 2.0	Target Release Date*
DacEasy DacEasy Accounting Financial software	Follows guidelines for Windows 95 interface–tabbed dialog boxes, property sheets, and so on. Multithreading should improve performance. Full support for OLE (client and server, as well as OLE automation). Built-in communications capabilities.	N/A	Y	90
Lotus Development SmartSuite 1-2-3, Ami Pro, and more	An all-new 32-bit code base, plus smarter SmartMasters, more Wizard-like Assistants, and a more consistent interface. Look for the LotusScript language to show up throughout SmartSuite. Integration with Notes should be tighter than ever.	Y	Y	?
Microsoft Office for Windows 95 Standard and professional editions	Expect a major upgrade to all office components. The 32-bit versions of Excel and Word (for Windows NT and Windows 95) were released last November. Priorities for the Windows 95 version of Office include support for the new user interface and more emphasis on consistency of dialog boxes and individual features.	Y	Y	90
Shapeware Visio Drag-and-drop drawing	Enhanced drag and drop, including right-mouse–button support, plus the capability to create and open new documents directly from desktop. Able to generate OLE events. Plug-and-Play awareness means users will be notified if connection with file is lost.	Y	Y	0
WordPerfect/Novell PerfectOffice The newest suite	No dramatic new features, but 32-bit code should mean better performance, while multithreading and multitasking will concentrate on printing and spell-checking. The major focus for developers is improving network access.	TBA	Y	?
America Online AOL for Windows 95 Online service	Multiple threads and preemptive multitasking should improve overall performance. OLE 2.0 drag and drop to/from text fields will be available in the first Windows 95 release, but not all features from the Windows 3.1 version will be supported initially.	TBA	Y	?
DCA Crosstalk Communications/fax	Full support for the Windows 95 interface. Integrated with Microsoft Exchange Server, the built-in universal mail client. New features will include a GIF viewer and additional terminal emulations. OLE support? Certainly as a server, possibly as a client.	Y	Y	90
Delrina WinFax Pro, WinComm Pro Communications/fax	Fully integrated with MAPI address books, supports voice mail, enables call discrimination. Improved telephony support should simplify modem setup. Multithreading/multitasking capabilities should provide true background operation, and OLE will permit in-place editing of faxes and cover sheets.	Y	Y	90
NCSA Mosaic World Wide Web browser	Because Mosaic is already a 32-bit program, it will perform better under Windows 95. Built-in networking should simplify setup of Internet connections, and OLE automation will let users write programs (in Visual Basic, for example) that send Mosaic out to search the Internet for specific items.	TBA	Y	0
Traveling Software LapLink for Windows File transfer, remote access	Windows 95's Plug and Play and improved modem and telephony support should improve usability and make it easier to connect to remote sites. Theoretically, a Windows 3.1 user can connect to a Windows 95 machine and run applications remotely.	Y	Y	180
Artisoft LANtastic Peer-to-peer networking	The combination of card-and-software starter kits with Plug and Play should make installation much simpler. Look for enhancements in security, performance, interoperability (including OS/2 and TCP/IP environments), and network navigation.	Y	Y	?
Collabra Software Share Group discussion forum	Tightly integrated with Windows 95 interface so users can navigate easily between applications. Better integration with e-mail. Easier, more pervasive network connections. Current version supports OLE, and the Windows 95 performance improvements should increase use of OLE.	N/A	Y	180

* NUMBER OF DAYS AFTER WINDOWS 95 SHIPS THAT UPGRADE IS DUE.

Company and Product	What's New?	Plug and Play	OLE 2.0	Target Release Date*
WordPerfect/Novell GroupWise Mail/scheduling	Integration with the Windows 95 shell makes it easier for users to access functions directly. Plug-and-Play support helps program behave consistently and correctly whether remote user is connected or detached from network. Full OLE support.	Y	Y	UPGRADE DUE 90
Borland Simplify Dashboard Desktop add-in	Full support for Windows 95 interface, including extensive drag and drop, dialog boxes, awareness of long filenames, and use of the Registry. SmartDialer will take advantage of modem support and Dial Helper. Partially an OLE client.	Y	Y	UPGRADE DUE 90
McAfee VirusScan Virus detection/removal	Easier installation and use thanks to Windows 95 interface standards such as property sheets. Plug-and-Play support will automatically identify and scan a floppy disk or CD as soon as it's inserted, and a VxD-based scan engine should provide better protection.	Y	N/A	UPGRADE DUE 90
Stac Electronics Stacker Disk compression	New, all-32-bit drivers will completely replace the DriveSpace component of Windows 95. Multitasking will allow compression to take place in the background, improving performance. Adds support for long filenames and Plug and Play.	Y	N/A	UPGRADE DUE 0
Symantec Norton AntiVirus Virus detection/removal	An Express (scan-only) version will be available the same day as Windows 95. The full package, with a 32-bit VxD-based architecture, is due 90 days later. It will scan files after they're received via modem and write the file to disk only if it's virus-free.	Y	N/A	UPGRADE DUE 0
Symantec Norton Utilities Disk and system diagnostics	Fully 32-bit utilities run in protected mode for faster performance and true background operation. Support for long filenames, plus consistent use of Windows 95 user interface and Registry. Plug-and-Play support will let Norton Disk Doctor pause to allow incoming faxes or data transfer.	Y	N/A	UPGRADE DUE 0
Corel CorelDraw 6 Graphics package	Fully 32-bit code means better performance, crucial when working with large graphics files. Full OLE support means it's easier to create rich compound documents that contain graphics, and easier to work with them via in-place editing.	Y	Y	UPGRADE DUE 0
Microsoft Publisher Desktop publishing	Dramatically different look and feel thanks to system support for toolbars and common dialog boxes. New 32-bit code means performance improvements in load times, Wizards, and other areas. Already an OLE 2.0 client with full drag-and-drop support.	Y	Y	UPGRADE DUE 90
Software Publishing Corp. Harvard Graphics Presentation graphics	Full support for the Windows 95 interface, including easier installation and hooks to the Uninstall feature. Completely rewritten code means smaller executable files and faster performance—overall and in specific functions. OLE client and server support.	N	Y	UPGRADE DUE 90
WordPerfect/Novell Envoy Cross-platform portable document software	Full support for Windows 95 interface, with accompanying advantages in ease of use when reading and creating documents. Plug-and-Play support will allow detection of changes in video resolution and available printers. Plans call for DLE client support.	Y	Y	UPGRADE DUE ?
Borland International dBASE for Windows Database manager	Support for long filenames and the Windows 95 interface. New 32-bit code base should improve performance. According to Borland, dBASE will "support OLE 2.0 features that are required for the Windows 95 logo." Plug-and-Play support is still under development.	TBA	Y	UPGRADE DUE 90
Microsoft Visual FoxPro 3.0 Database manager	FoxPro 2.6 was already 32-bit, so there's no rewrite needed here. This upgrade will provide FoxPro applications with direct access to Windows 95 system services, including long filename support and the Registry. Applications can also be made Plug-and-Play-aware.	Y	Y	UPGRADE DUE 0
Blue Sky Software RoboHelp Help system compiler	Full support for Windows 95 Help file format, including full-text search in the created file. Improvements for developers include hierarchical graphical view of entire files, toolbar buttons in secondary windows, and faster compiles. Full OLE 2.0 compatibility.	N/A	Y	UPGRADE DUE 0
Borland International C++ version 2.0 Development environment	Current 16-bit version supports Windows 95. In 32-bit version, multithreading should improve compilation speeds and increase developer productivity. Allows developers to easily add OLE client and server support so applications can interoperate with suites.	N	N/A	UPGRADE DUE 90
Microsoft Visual C++ Development environment	Features will not change from current version for Windows NT; interface changes will be the only difference. Plug-and-Play support and full OLE functionality (client, server, container, automation) can be added to any application.	Y	Y	UPGRADE DUE 0
Block Financial Software Managing Your Money Personal finance	Completely compatible with Windows 95 interface, including long filenames, which make data sets easier to identify. Greater use of built-in controls, for example, will use hierarchical lists extensively. Plug and Play improves modem and printer support.	Y	N/A	UPGRADE DUE 0
CrossTies Software CrossTies Personal information manager	Will adopt Windows 95 look and feel, including right mouse-button menus, tabbed dialog boxes, and 3-D controls. DLE support allows drag and drop from desktop folders into programs and documents. Integrates with Windows 95 Explorer for browsing, and with Exchange for e-mail.	N/A	Y	UPGRADE DUE 0
Elan Software GoldMine Contact management	New 32-bit code base should improve performance. Will incorporate Windows 95 interface, including use of rich-text editing control for simple word processing tasks. May provide custom links to dial-up networking and Briefcase synchronization feature.	N/A	N	UPGRADE DUE 0

* NUMBER OF DAYS AFTER WINDOWS 95 SHIPS THAT UPGRADE IS DUE.

■ Applications/Suites ■ Communications ■ Networking & Groupware ■ System Utilities
■ Publishing & Graphics ■ Databases ■ Development Tools ■ Business Utilities

Crossroads

QIC vs. DAT: The Most

BY MATTHEW LAKE

QIC: Quarter-inch cartridge drives come in many shapes and sizes, from internal desktop models to server-based multigigabyte drives. The drive writes data in parallel tracks on a fast-moving tape. When it gets to the end of the tape, the drive reverses direction and shifts the heads to record on the next track on the tape.

Write Head   Read Head   Write Head

Pros
- The DC2000 minicartridge has a strong presence in desktop PCs.
- Many models : un from the floppy-drive controller.
- A wide variety of capacities is available.

Con
- Tapes are expensive.

Verdict

QIC: For server-based backups, there are no compelling reasons for proponents of DAT to move to QIC DC6000 cartridges, or vice versa. But for the majority of people who use QIC's smaller format DC2000 minicartridges, disk drives larger than 300MB require more than one tape for a full backup: That's a significant reason to move from smaller QIC tapes to larger, SCSI-based QIC systems. The reasons for using a DAT system for desktop backups, however, are less clear. The old conventional wisdom still holds in our assessment—DAT for servers, QIC for desktops.

The Buzz

Right Tool for the Job. There was an even split of votes among the respondents to our survey of industry experts. And that's not surprising, since each technology serves different needs. QIC tapes come in two formats: the paperback-book–size DC6000 and the half-size minicartridge DC2000. Minicartridge QIC tapes hold about 250MB of data (sometimes more with compression), at a cost of about $15 to $20 each. DC6000 QICs reach tens of gigabytes each (compressed) for around twice the minicartridge price. DATs allow for up to 8GB of uncompressed storage per tape at a cost of about $7 to $20 each.

Popular Tape Backup Techniques Vie for Desktop Domination

DAT: Digital audio tape works like the technology in a recording studio or a VCR. A spinning drum with two read heads and two write heads records data in a herringbone pattern recording on slow-moving tape that's wrapped around the drum.

Pros
- Tapes are inexpensive.
- Uncompressed DAT capacities are generally higher than QIC capacities.
- DAT drives have a significant presence in the server market.

Cons
- Tape is more susceptible to moisture and extremes of heat.
- Data rates are slower than comparably equipped QIC drives.

Timetable

More Gigabytes for All: Both technologies will get a capacity boost within the space of a year: The National Storage Industry Consortium (NSIC) is researching ultrahigh-density recording technology. The goal? To increase recording density in tape backup and hard disk drives. They are planning multilateral expansion: The idea is to bring both DAT and QIC recording densities up to one terabyte per cubic inch at massively enhanced data rates. This stands to prevent obsolescence in both QIC and DAT tape technologies as hard-disk-drive capacities continue to increase.

Opinions

> DAT is handicapped exactly the same way that CD-ROM was—it was an audio-based technology that operated at audio rates. New DAT-2 drives have doubled that speed. QIC data cartridges operate at substantially higher data rates. Of course, none of that matters; disk and software overhead evens everything out. Plus or minus a cup of coffee.
>
> **WINN L. ROSCH**
> CONTRIBUTING EDITOR

If you regularly do large full backups, DATs are fast, the tapes are cheaper, and they hold a lot more than QIC minicartridges.

VINCENT CHEN
CONTRIBUTING EDITOR

Help: Working Smarter

A Hitchhiker's Guide to File Formats

Douglas Adams fans know the secret to universal communication: Just get your hands on a Babel Fish. This remarkable little invention first appeared in *The Hitchhiker's Guide to the Galaxy*, complete with a detailed technical description of how it worked. Here's the short version: You stick the Babel

Fish—"a small, yellow, leechlike creature, probably the oddest thing in the Universe"—in your ear. As soon as you do, you can instantly understand anything said to you in any form of language.

Unfortunately, the Babel Fish for Windows 95 project is running a bit behind schedule, which means that whenever you try to communicate with a colleague or coworker who speaks some baffling language from another planet—like Lotus 1-2-3 Release 5 for Windows, say, when you speak Microsoft Excel 5.0—you'll need to find common ground somewhere. The right solution? That depends on what you're trying to accomplish.

Fun with Formats There are some file translations that work well enough for most Earthly purposes. If you want to convert a memo from WordPerfect 5.1 for DOS into Word 2.0 for Windows, for example, you're probably in luck. Why? Because both formats are relatively simple, having been created in a kinder, gentler, less graphical era, and because both WordPerfect and Microsoft have invested thousands of programmer-hours in making sure those file filters work.

But what if you speak Word 6.0 and the guy across the hall only knows Ami Pro 3.0 or WordPerfect 6.1 for Windows? Then life isn't quite so simple: You'll need to find an intermediate file format, a lingua franca that both of you can fall back on. Sound too good to be true? It is. No matter which direction you send it, your carefully-crafted newsletter, with its columns, frames, embedded graphics, and oh-so-precise typographical touches, will lose some of its wonderful Wysiwyg-ness along the way. If you've pushed the spreadsheet envelope until it's bursting at the flaps, you'll have an even tougher time. It's a sure bet that some of those live links to external data, do-it-all macro buttons, and presentation-quality formatting will drop out on the road between Excel and 1-2-3 or Quattro Pro.

Why So Tough? Blame it on creeping feature-itis. Each new version of the big desktop productivity programs packs in more and more features—think of Excel's Visual Basic for Applications (VBA) or 1-2-3's new map-making capability, for example. Reverse-engineering these complicated new tricks and providing a push-button translation option is not a trivial task.

Most of these applications live in different programming environments as well, so fancy features like macros and button bars are difficult—if not impossible—to debabelize. And even seemingly simple details like borders, shading, tables, and styles are handled in different ways by different programs, making life a constant challenge for the programmers responsible for producing filters.

What's a poor, productivity-obsessed user to do? Take your pick from among these three options: You can switch. You can search for a compromise format. Or you can settle for a third-party solution (see "A Versatile File Converter," below).

SOLUTIONS | A VERSATILE FILE CONVERTER

Multilingual: For most of us, fancy file-translation software is overkill. If you exchange files in two or three common formats, do you really need to be able to handle MultiPlan 1.0 worksheets?

But every Windows user should own a copy of Outside In from Systems Compatibility Corp. Version 2.1g of this program includes filters for 175 DOS, Windows, and Macintosh file formats—including word processors, spreadsheets, databases, faxes, and compressed files. Instead of trying to convert one format to another, Outside In provides read-only viewers that let you copy part or all of a document to the Windows Clipboard, then paste it into the current document. Best of all, you can even print a document without starting up the application that created it. And at a street price of less than $75, Outside In is a steal.

Outside In for Windows (Version 2.1g) / Systems Compatibility Corp. / $89 list, single user; $800 for 10-user license / (800) 333-1395 / *Reader Service No. 720*

Guts.

CLARIS

ClarisWorks
THE MAGAZINE ALL-IN-ONE FOR BUSINESS · HOME AND EDUCATION

The leanest, meanest, all-in-one software for word processing, spreadsheet, database, charting, drawing, painting, and presentations.

What it takes to run your own business in the 90s.

New ClarisWorks 3.0 for Windows

You've got the stomach for it, now get the software. ClarisWorks 3.0 software has what it takes to manage your office tasks and succeed in the "gotta have it by yesterday" 90s. No wonder three million* users worldwide have discovered it's all the power you need without useless features that slow you down.

With ClarisWorks, you can churn out letters, memos, reports, budgets, presentations, proposals, sales flyers, mailing labels, contact lists, newsletters—virtually anything you need to run your business.

ClarisWorks integrates all the functionality of six software applications into one—with a streamlined feature set and responsiveness that gets the job done fast. For example, you can easily add graphics, charts or a spreadsheet to your text in a couple of mouse clicks.

Need to get a document out fast? Let Claris Assistants step in to do the hard work for you. Assistants guide you

through complex tasks like creating tables, and provide expert advice on design for newsletters, presentations and more. You'll also find 150 push-button "Shortcuts" that reduce routine tasks to one mouse click.

Unlike other "Works" and "Office" products, ClarisWorks has much smaller memory and storage requirements. Its compact design and high performance makes it ideal for notebook computers.

You've got the guts, now go for ClarisWorks. What it takes to succeed in the 90s is a fast phone call away. Take advantage of ClarisWorks' $69† new low price and get SofNet's FaxWorks (a $29 value) free with your order. Call 1-800-293-0617 or see your Claris dealer today.

Free Trial

for a free trial version of ClarisWorks, call
**1 800 293 0617,
ext. 542.**

CLARIS

Simply powerful software.™

The Match Game: What's the best way to bring disparate data sources together? Depending on your data, OLE or ODBC may be the best solution.

Every experienced Windows user knows how Object Linking and Embedding (OLE) is supposed to work: Use Edit Paste Special (or drag and drop) to embed one file within another, or link two separate files to create a compound document. To edit an OLE object, just double-click on it.

But what if you don't have a copy of the program that created the OLE object? No problem. That embedded object actually includes two types of data: native data and presentation data. The native data is all the information needed for an application to edit the object; the data is useless without the application in which the object was created. But the object's presentation data provides all the information you need to display the object on a screen and print it. So if you send Excel users a Word document with an embedded Lotus 1-2-3 worksheet, they can see the numbers, even if they can't edit them.

The Open Database Connectivity (ODBC) solution gives database users the best of both worlds. Instead of attaching a plain old DBF file to your database application, use ODBC to directly query the data using SQL statements. To get to external data using ODBC, you'll need the appropriate ODBC driver. (It shouldn't be difficult to find; there are nearly 150 supported applications.) Assuming both sides of the request support ODBC, you can create applications that pull data from multiple sources into a single destination—from xBASE, Paradox, and Oracle tables into a Lotus Approach application or an Excel worksheet, for example.

Let's start with the unvarnished truth. All file-translation solutions are doomed to failure. Unless your documents are from the Dick-and-Jane school of interpersonal communication—one-syllable words in 10-point Courier—the best you can expect from most file-translation solutions is that they won't discard so much of your data in the journey from Point A to Point B.

If you regularly share highly formatted documents and you can't compromise on quality, your best choice is to standardize on one application in each category. Arm wrestle, if you have to. Draw straws. Get a neutral third party to make the decision. But take the plunge, because that's the only way to guarantee that you'll see the same thing on both screens.

Compromise Solutions Of course, I'd rather give up a kidney than give up my word processor. If you and your coworkers feel the same way, then you'll need to agree on a less drastic solution. The secret of (partial) success is compromise—finding a file format that lets you share as much as possible without sacrificing productivity. Here are the best universal formats for the four major data types:

Text Treatments ASCII text is the lowest common denominator. When you save a file in this format, you preserve most of the words and numbers, but you lose things like fonts, margins, tables, lines, and shading. That's fine for ordinary e-mail, but lousy for any document where appearances matter.

Instead, use Rich Text Format (RTF). For anyone working in a graphical environment—and that includes Windows and Mac programs—RTF is the only way to go. The RTF specifications are incredibly complex; Version 1.3, available from the Microsoft Software Library as GC0165.EXE, includes more than 44 pages of densely packed information in (appropriately) Rich Text Format. The spec includes everything you can imagine, from obvious stuff like fonts and colors and margins and tabs to tricky features like revision marks, style sheets, and embedded objects.

The people who make word processors guard their proprietary formats more closely than the formula for Classic Coke. But RTF is a published, universally accepted specification, which means that when you open or save a document in this format you can guarantee that you'll get what you expect. Every major word

---

processor, without exception, supports RTF fully. If you have to send a highly formatted document to someone and you're not sure which format to use, choose File, Save As and then select Rich Text Format from the list.

Spreadsheet Secrets This is the original "killer app," so why is it so hard to get information from one place to another? Probably because every developer takes such a different approach when it comes to formatting and formulas. If you have to share a spreadsheet with a colleague, you have two choices. Neither one is likely to produce perfect results.

The original Lotus 1-2-3 format, WKS or WK1, is the lowest common denominator. You get all the numbers, most simple formulas, and basic formatting like column widths. But you'll have to settle for one sheet at a time. In this format, Microsoft Excel workbooks and the tabbed multiple sheets in Lotus 1-2-3 Release 5 will get broken up Humpty Dumpty-style, and whoever's on the receiving end will have to put all the pieces back together again.

The only way to save multiple sheet workbooks is by using one of the latest file formats from Lotus Development or Microsoft. Unfortunately, neither of them is up-to-date. Excel handles 1-2-3 Release 3 files, but can't count any higher. Lotus 1-2-3, meanwhile, is OK with Excel 4.0 workbooks (which use the XLW extension), but chokes on Excel 5.0 workbooks (which, confusingly, revert to the XLS extension). When you open an Excel workbook in 1-2-3, only worksheets, macro sheets, and Excel 4.0 macro sheets make it across the wall: Visual Basic modules and dialog boxes get left behind.

Database Decisions Today's databases can handle complex graphical objects like pictures and video clips. Fortunately, though, most of the data that's sitting around in your organization probably consists of unformatted text and numbers. And sharing those collections is a snap. You have two easy choices, depending on whether you're making a one-time translation or planning to reuse the stored data.

For easy imports, drop straight to the lowest common denominator, comma-delimited ASCII. This format is known by various names, including comma-separated values (CSV) and delimited text. Whatever you call it, it's easy to understand: Every

The Only Thing That Matters More Than What They Think –

SCORECARD	AMERICA ONLINE CROSSES THE FINISH LINE FIRST		
Factor	**America Online**	**CompuServe**	**Prodigy**
1. Exchanging E-Mail *Weighing Factor: 35%*	★★★★ Easy to navigate, attach files, and go.	★★★ Step-by-Step instructions, but too cryptic.	★★ Road closed to other online services without add-on software.
2. Downloading Files *Weighing Factor: 20%*	★★★★ Straightforward and user-friendly.	★★★½ Lots of files; hard to find among forums.	★★★½ Needs better search capabilities.
3. Accessing Data *Weighing Factor: 20%*	★★★★ Top choice for up-to-date information.	★★★ Unmatched depth of information.	★★★ Testers rated these sections highly intuitive.
4. Accessing the Internet *Weighing Factor: 15%*	★★½ The only one with true Internet access.	★½ No Internet info. and even sending mail is tricky.	★½ Only Internet info is a glossary and a BBS.
5. Working Offline *Weighing Factor: 10%*	★★★★ Easy to compose mail offline.	★★★ Need Navigator software to work offline.	★½ No can do without new software.
Verdict *100%*	★★★★ So Easy, it's hard to believe you're online.	★★★ Database depth, but not always easy to use.	★★ Rock-solid for data, but that's it.

★★★★★ *Excellent* ★★★★ *Good* ★★★ *Acceptable* ★★ *Poor* ★ *Unacceptable*

Is What You Think.

BEFORE AND AFTER | IMPORTANT DATA GETS LOST IN THE TRANSLATION

One-Way Street: The fancier the worksheet, the more you're likely to lose in the translation from Lotus 1-2-3 Release 5 to Microsoft Excel 5.0. Spreadsheets, unlike word processors, don't share a common rich *data* format. Without that common ground, your hard work is lost.

Beauty: This Lotus 1-2-3 Release 5 worksheet contains formulas, formatting, macros, and lookup tables stored in three separate sheets. When we saved it as a Microsoft Excel workbook, Lotus 1-2-3 warned us that 10 formulas would be lost.

Beast: When we opened the same worksheet file in Microsoft Excel 5.0, not only did we lose formulas, but we found several errors, awkward formatting, and a mostly useless file that needed to be recreated if we wanted to use it in Excel.

---

item in each column or field gets translated into text. If there are embedded spaces, the data gets surrounded by quotation marks. Every field is separated by a comma, and each record ends with a carriage return. Any database worth its salt imports and exports delimited ASCII files easily. You'll lose indexes and relational links stored in data dictionaries, but those can be recreated fairly easily.

If you want to use the same data file in two or more databases written in different applications, your best choice is the DBF format. Originally developed for dBASE, this is as close to a lingua franca as you can get. You could look on every shelf of every Egghead store in the galaxy and not find a database management program that doesn't understand dBASE (or xBASE, if you want to be politically correct about it). For one-time data transfers, just import a DBF table into your application. But most database applications also allow you to attach a DBF file and treat it as though it existed in the native format. In Microsoft Access, for example, choose File, Attach Table and pick one of the dBASE or FoxPro options (both use the DBF format). Borland's Paradox works the same way—this is not surprising, since Borland

International owns dBASE as well. And Lotus Approach doesn't make you choose, since it stores data in DBF format by default.

Graphics Even the most highly evolved Babel Fish would have trouble with all the graphics formats available to Windows and Macintosh users. So let's skip past all the vector-vs.-raster confusion and cut to the two simple choices:

For anyone who adheres to the KISS principle (Keep It Simple, Stupid), the best choice is bitmap (BMP) or Paint-Brush (PCX) format. Neither one is particularly compact or elegant, and they don't scale well, but it would be difficult to find an application—DOS, Windows, or Mac—that couldn't easily handle these lowest-common-denominator formats.

For more complex graphics that may need to be reused or resized, Windows Metafiles (WMF) are by far the best choice. By definition, any Windows application includes support for this format, which is a way of recording instructions to the Windows Graphical Device Interface (GDI) for later playback. If your image editor doesn't have this choice on the File, Save As menu, try simply cutting and pasting the image; the Windows Clipboard uses metafiles to pass images from one application into another seamlessly.

Maybe in some parallel universe, there's a world where everyone uses the same applications to create files that look the same on every desktop. It sure isn't this one. So long, and thanks for all the formats.
— ED BOTT

IF YOU THINK REMOTE COMPUTING IS A HASSLE, YOU'RE PROBABLY NOT ONE OF THE MILLIONS OF PEOPLE USING pcANYWHERE.

What good is working away from the office if you can't access your PC? Unfortunately, most remote computing software has become so complex, you may waste more time setting up your call than getting work done. Luckily, now there's Norton pcANYWHERE™ 2.0 for Windows.

THE BEST GETS BETTER.

pcANYWHERE is probably the most advanced implementation of remote computing technology available, made easy. But don't take our word for it. Millions of people have already expanded their ever-growing work environment with Norton pcANYWHERE.

And why wouldn't they? Norton pcANYWHERE doesn't replace your system .INI, keyboard, mouse or video drivers, so you don't have to change your Windows environment just to

NEW VERSION 2.0

use pcANYWHERE. And no TSRs are required, freeing up memory for other applications. It even has remote drive mapping that lets you work with both your home and office hard drives as if they were one. So you don't have to constantly track where the document you're working on resides, which means less time transferring files. And to make sure you're always working with the most recent version of your document, our new file manager allows you to synchronize files and directories on remote and office PCs.

LEAVE YOUR HASSLES AT THE OFFICE.

But the real beauty of Norton pcANYWHERE is it's easy to use. And to make it even easier, we've included Smart Set-Up™ and Norton Assistant to help you get up and running right out of the box. Cue cards to display help information with just a click of a

The Peter Norton Group has made remote computing easier for everyone with Norton pcANYWHERE.

button. And a graphical user interface with long file name support already built in to help move to Windows 95.

DON'T PUT IT OFF.

To purchase your copy of Norton pcANYWHERE 2.0 stop by your local software store today. We do not think you'll be disappointed. After all, how can millions of people be wrong.

SYMANTEC.

MAKE FREELANCE GRAPHICS A MORE EFFECTIVE TOOL

Personalize Your Presentation Graphics Weapon

Break a Leg You have to admit that creating a presentation is definitely better than *giving* a presentation. And if you use Lotus's Freelance Graphics, you can tweak your software to make presentation preparation easy and enjoyable. There are a host of customization options that cut time and snags out of the creation process—and make your presentations look better in the long run.

Your Own Toolkit True to the Lotus way, Freelance Graphics' SmartIcons (see "Brilliant Buttons," at right) present you with an effortless, no-nonsense way to create customized toolbars. Load up your toolbars with the tools you use most often for those tricky activities (such as charting), and you're ready to roll.

You can add some helpful graphical guides and shortcuts to your screen by choosing a few simple options (see "Rules of Text" and "Function Precedes Form," at right). Rulers are especially useful for presentations that require absolute precision.
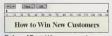
Have It Your Way Freelance Graphics also offers plenty of ways to set options once—exactly as you like them—so you never again have to remember what you prefer or how to set it up. Set up automatic backup options, and select the default units of measurement (see "Protect Yourself" and "Measure the Difference," at right). Once you've configured your customized options, Freelance Graphics functions as a seasoned veteran employee who knows your style.

KYLA K. CARLSON

GUIDED TOUR — TWEAK FREELANCE GRAPHICS JUST SO

Brilliant Buttons: Configure your SmartIcons (Tools, SmartIcons) to include your favorite features. Then you can make various sets of icons available by going back to the same dialog box and highlighting the toolbar name that suits your task.

Rules of Text: When you need your text to fit within a specific space on a page, use a ruler as a guide. Under View, View Preferences, mark the Text block ruler option. Each time you click on text that you want to edit, the context-sensitive ruler will pop up.

Protect Yourself: Freelance Graphics' User Setup dialog box (Tools, User Setup) lets you configure your Auto timed save and Backup options. It also lets you set the view in which you would like the application to start, as well as enable and disable the Undo feature.

Bullets with Style: You don't have to settle for boring round bullets. From Text, Bullet, choose Style for a list of options. To take that one step further, click on Symbol and choose a shape or design from more than 50 categories.

Function Precedes Form: Sometimes using function keys is faster than using menus and dialog boxes. From View, View Preferences, click on Function key panel.

Measure the Difference: Just because Freelance Graphics defaults to millimeters as a unit of measurement doesn't mean you have to. Under View, Units & Grids, choose your preferred unit of measurement, in addition to handy grid options.

SURVIVING A NEW CORPORATE STANDARD

And Now for Something Completely Different

Most workplaces find that creating standards saves everybody a whole lot of heartache. You get a standard PC with a standard modem, standard monitor, and standard software. With standards, you know that if you sit down at somebody else's computer, it'll behave the same as your own. Once you learn this setup, it's yours for life.

Or at least until someone takes it away. That's the problem with corporate standards: They're so darn fickle. You get some new hardware, and, what the heck, upgrade all the applications to their Windows versions. Or your company hires a new IS director who, after a lengthy cost-justification presentation and a three-martini lunch, brings in a new batch of applications.

Either way, all the users in your organization must be trained to use a new application, and it's up to you to make the transition fast, painless, and inexpensive. The first step in training is to decide how to introduce the new software to the users.

Since we're talking about programs they use every day, the most important factor is minimizing the impact on productivity.

Two Paths Diverge Learning a new program can be as traumatic for some users as quitting smoking. People develop strong psychological ties to the applications they use and are often content to stick with an "inferior" application because it's familiar.

One way to ease the pain is to let them work in the old familiar application for a few hours a day, and use the new one for increasingly lengthy periods. This may introduce an element of confusion: "Do we press Ctrl-Q or Ctrl-W?" "Is it F7 or Shift-

F1?" The more proficient users are with the old program, the greater the confusion.

Another method may be described as the cold-turkey approach. Set a deadline for the transition and remove all traces of the old application from the system by that date. This ensures the complete transition to the new application, and while some users may struggle and complain, the reality of the situation will convince them to let go of old habits and learn the new program as fast as they can. Of course, you'll probably spend a couple of weeks running a trauma center, too.

No matter how you plan to make your transition, there will be some period of decreased productivity. Count on it, and try to schedule the changeover for a non-critical time. For example, the last week of your fiscal quarter would be a bad time to introduce a new accounting package. Unless you like mayhem.

Determining Factors When you look for the most effective training method, there are three things you should

---

TOOLS OF THE TRADE SELF-PACED VIDEOS FOR THE UNATTENDED CLASSROOM

Just Press Play: Having decided to standardize on Microsoft Office, the California Franchise Tax Board (see "Painless Transition with the Right Training Method," page 202) chose Anderson Soft-Teach's training videos as the most effective way to go. There's no Office video package per se, but the videos include a Word and an Excel offering. The videotapes are well-structured, and they include a practice disk with all the necessary files accompanied by workbooks for hands-on practice and review.

After following the tape, users take a test and earn a certificate of completion. Tapes may be watched in a group setting or individually. The obvious advantage of individual viewing is that the user can pause and rewind as needed, but small groups (3 to 5 users at a time) can also manage very comfortably. Other video training products from J3 Learning and ViaGrafix are also available. Anderson and J3 Learning concentrate on corporate

Anderson Soft-Teach's videos include clearly defined performance objectives.

clients, while ViaGrafix is widely sold at retail stores.

SmartCourseware / 5995 direct / Anderson Soft-Teach / (800) 338-4336/
Reader Service No. 721
Integrating MS-Office / 5800 direct / J3 Learning / (800) 532-7672/
Reader Service No. 722
MS-Office Deluxe Training / 5699 direct / ViaGrafix / (800) 842-4723/
Reader Service No. 723

take into consideration: Time, money, and available resources.

If time is of the essence (say there's a corporate transition deadline) look for crash-course solutions that cram as much information as possible into a short period. While crash courses aren't as comprehensive or cost-effective as other methods, they usually get users up and running in short order. Look for one- to three-day courses. See if you can negotiate a customized program with the course instructor to meet your organization's specific needs.

If your budget prohibits extensive training programs, consider a recyclable method, such as video, audio, or computer-based training. Though often less effective than an instructor-based solution, these programs stretch your training dollars.

If you don't have a classroom, or a place where a group can watch a training video, you may have a resource constraint. You can often circumvent such problems by using conference rooms as classrooms or by paying people to get together in the evening to run through a training video at somebody's home. Just don't plan to bring teachers onsite if you have nowhere to put them.

Failing to reach a decision on the best

Cost Analysis: Video Training

Video on Demand: Investing in the Anderson Soft-Teach training videos has saved one company hundreds of classroom instructor-hours per year. The company saved even further because the instructor was freed for other projects.

training method, some organizations elect to send employees to local training centers on company time.

Assess Your Success Regardless of the training method you decide on, there is one thing you must do: Design a follow-up procedure (or post-testing) to establish the effectiveness of the program.

This should be done immediately following the training, and then (at the very least) one month later and again six months later. Users often seem happy with the instructor or the instructional program and rate the training very highly, but will exhibit poor retention a few months down the road. YAEL LI-RON

The Tale of the Frugal Tax Collectors. Sacramento-based California Franchise Tax Board has standardized on Microsoft Office as its business application suite. According to Jackie Martin, project analyst, there were numerous word processors and spreadsheets in use by different divisions, some DOS-based, others Windows-based. The motivating factor in the decision to implement a new standard was new hardware. (They'd purchased 300 PCs, and the time was right to upgrade to Windows.)

The training solution accepted by all six divisions was Anderson Soft-Teach's videotapes. Each division evaluated the program for two weeks, and the Tax Board also conducted a cost analysis that pitted training consultants against the Anderson solution. The advantage of the Anderson program was clear: This was a resource that could be accessed by new learners over the next months at no additional cost, especially since time would be not be a factor in this transition.

From Office to SmartSuites in No Time Flat. MCI's Bay Area Sales Branch Office needed a new suite standard to go with OS/2. Since Microsoft doesn't make an OS/2 version of its Office suite, the choice was clear:

Lotus SmartSuite, which does offer an OS/2 version. According to Bill McClellan, systems administrator, the new software was installed in March 1994; between March and June, both suites were in use to ease the transition. All traces of Office were permanently removed from the system in June, by which time a training program had been implemented.

The Corporate Training Department had designed a self-study program that included handbooks, reference guides, and workbooks. Each training module was designed to take about 15 minutes. It was a well-structured program, but as it turned out, it was impossible to motivate employees to take the time and go through the program on their own. McClellan's office decided to outsource. The Martinez Adult Business Training Center in Martinez, California, was contracted to conduct a three-day training program on Lotus 1-2-3 and Ami Pro. In that period, 45 employees went through the program, at a cost of $35 per person per day. This was an inexpensive way to get people up and running with new software as soon as possible. The outcome has been satisfactory and most users have demonstrated a smooth transition.

Help WORKING SMARTER: Do It Yourself
Vince and Woody Show You How to Reconcile with Access

A Reality Byte for Access' Northwind Traders

I was tooling along one of those badly surfaced back roads—some folks call them "blue highways" because they're always drawn in blue on road maps. All of a sudden I rounded this blind curve and ran smack-dab up against an old truck. I mean, this guy was doing maybe ten miles an hour. Oncoming traffic zoomed by—no chance of passing.

I squinted a bit in the sun and saw that the back of the truck was packed with . . . chickens! Hundreds of the suckers, squawking and pecking and raising all sorts of Cain, loose feathers swirling in the wake of the truck's slow progress.

All of a sudden there was a loud *POP!* and a cloud of black smoke oozed out of the truck's tailpipe. The engine seized with a clatter, and we both came to a complete standstill. I could see the guy in the truck kick a tire as he propped open the hood.

I walked up to him. Man, what a rube. Hadn't shaved in a week, or bathed in two. And he's swearing a blue streak. So I try to act friendly, ya know, and I say to him, "Jeeeez. That's quite a load of chickens you got. How many of 'em are back there?" He pauses for a few heartbeats.

"See," he says, and shuffles back into the truck. I move around to the side of the rusted relic, trying to see what he's doing there in the cab. "Fer hunnert an seventy three hens," he shouts over the traffic, "an three hunnert an ten roosters." He looks up, catches me peeking at him. "Hell's the matter with you, boy?" he says. "I got the numbers on this here ThinkPad. You never seen a computer before?"
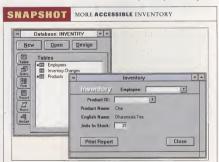
Ah, Inventory Systems This month we'll try to convince you to break the shrink-wrap on your copy of Microsoft's Access by giving you a useful adjunct to one of the demo programs that ships with it—the Northwind database—along with step-by-step instructions for getting it to work.

Access ships with several useful sample databases, including a cool inventory program for a fictitious company called Northwind Traders. But there's a gaping hole in this program that drove us to distraction. Most companies take a physical

inventory at least once a year—a reality check, as it were, to make sure the computer's Units In Stock number matches physical reality. Reconciling the computer's inventory with the real thing usually involves two steps: first, a trusted employee has to go in and change the Units In Stock numbers; and second, the bottom-line value of inventory has to be calculated—it's the number everybody stays up all night to see. The Northwind Traders database will let you mess around with the Units In Stock numbers, but in the real world any comptroller worth his or her salt will insist on an audit trail—a detailed record of who made

what changes to the numbers, what the numbers were before the change, and where they stood after the change.
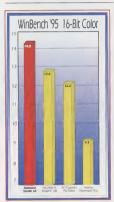
We've written an add-on to NWIND.MDB called INVENTRY.MDB that tackles these problems. From the user's point of view, this is pretty simple. Open the INVENTRY-.MDB database, and an inventory reconciliation window pops up. Select your name from the offered list of employees, then pick and choose each product by its unique ID, updating the Units In Stock number if necessary. When you're done, click on the Print Report button, and the Comptroller's report comes out. It's far from a high-security solution, but it beats a poke in the eye with a sharp stick—a good working definition of what most comptrollers would dole out, faced with an unaudited manual change in inventory figures.
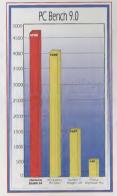
If you don't feel like typing, see page 316 for information about downloading NW_INV.ZIP from PC Contact's data library 1 (Windows Applications). This file includes a summary inventory valuation report that

SNAPSHOT MORE **ACCESSIBLE** INVENTORY

Balance the Books: The final INVENTRY.MDB application is used to manually reconcile a physical inventory with the inventory maintained by the computer. A trusted employee makes changes to the Units In Stock number and then prints an audit report.

we don't have room to talk about in this column. If you download it, as opposed to building it from scratch, you'll have to "attach" the Northwind database. Be sure to read the INVREAD.ME file for instructions.

To Work In Access, click on File, New, and type INVENTRY.MDB. In the Database:INVENTRY window, click First; click on File, Attach Table; pick Microsoft Access; navigate around to your \access\sampapps directory; and double-click on NWIND.MDB. Click on Products, Attach, Employees, Attach, and click on Close. There. You're ready.

You'll need a new table to keep track of items changed to reflect the physical inventory. That table needs only two fields: one for the product ID number, the other for the old Units In Stock. Next, in the Database:INVENTRY window, with the Tables filecard showing, click on New. Choose New Table. Set up the Product ID as a Number, then make it an Integer, with Indexed Yes (No Duplicates). And make the Old Units In Stock field a Number, Integer, Not Indexed. Put your mouse immediately to the left of the Product ID and right-click, choosing Set Primary Key to make the Product ID this table's main key. Hit Ctrl-S to save the table and name it Inventory Changes.

Now tell Access that the Product ID field in this Inventory Changes table already refers to the same thing as the Product ID field it already has in the Northwind Traders' Products tables. Click on the Database:INVENTRY window, and select Edit, Relationships. Add the Products and Inventory Changes tables. Drag the Product ID entry on the left and drop it on top of Product ID on the right. That establishes the link. Close the Relationships window (just double-click on the hyphen-thingy at its upper left corner), and save the changes.

Now, for the Form that lets you change Units In Stock numbers. Back in the Database:INVENTRY window, click on the Forms filecard and hit New. Up where it says Select a Table, click on the down arrow and pick Products. Hit the Form Wizards button, select Single Column, and click on OK. Select each of these fields, in turn, to include on the form: Product ID, Product Name, English Name, and Units In Stock. Click on Next>>. Choose the embossed style and click on Next>> again. Type in the name Inventory, pick "Modify the form's design," and click on Finish.

Save the new form by hitting Ctrl-S, and name it Inventory. Put the mouse pointer just above the Form Footer bar and drag it down a bit to give yourself some breathing room—the two buttons go down there.

These Access Basic programs make INVENTRY.MDB work. To start, go into Database:INVENTRY, click on Forms, Inventory. Way up on the menu, click View, Code. Pick from the two drop-down lists to go through the controls and events. Type them in as follows:

In (general)_(declarations):

```
Option Compare Database 'Use database order for string comparisons
Dim OldNumber%, NewNumber% 'Holds the values of old and new ⌐
  ⌐Units In Stock
```

In Form_Load:

```
Sub Form_Load ()
    ' Clear out the [Inventory Changes] table
    Dim MyDB As Database, MySet As Recordset
    Set MyDB = DBEngine.Workspaces(0).Databases(0)
    Set MySet = MyDB.OpenRecordset("Inventory Changes", ⌐
      ⌐DB_OPEN_TABLE)
    On Error GoTo NoRecords
    MySet.MoveFirst
    Do Until MySet.EOF
        MySet.Delete
        MySet.MoveNext
    Loop
Exit_Form_Load:
    MySet.Close
    Me![Employee].SetFocus
    Exit Sub
NoRecords:
    Resume Exit_Form_Load
End Sub
```

In Product_ID_AfterUpdate:

```
Sub Product_ID_AfterUpdate ()
    DoCmd ApplyFilter , "[Product ID]=Forms![Inventory]![Product ID]"
    Me![Units In Stock].SetFocus
End Sub
```

In Units_In_Stock_Enter:

```
Sub Units_In_Stock_Enter ()
    OldNumber% = Me![Units In Stock]
End Sub
```

In Units_In_Stock_AfterUpdate:

```
Sub Units_In_Stock_AfterUpdate ()
    Dim MyDB As Database, MySet As Recordset
    NewNumber% = Me![Units In Stock]
    If NewNumber% <> OldNumber% Then
        'Store Data in [Inventory Changes] table
        Set MyDB = DBEngine.Workspaces(0).Databases(0)
        Set MySet = MyDB.OpenRecordset("Inventory Changes", ⌐
          ⌐DB_OPEN_TABLE)
        MySet.Index = "Product ID"
        MySet.Seek "=", [Product ID]
        If MySet.NoMatch Then
```

Let's lock out parts of the form so the user can't screw around with things any more than necessary. On the form, right-click on the Product Name text box, pick Properties, and change the Locked property

One button. One finger. Total control.

Our FlexScan® professional display monitors now include ScreenManager,™ a powerful, on-screen control system that puts all vital image controls at your fingertips. ScreenManager gives you the feeling of a graphical user environment (GUI). All adjustments for color, distortion, sizing, moiré reduction and other functions are easily made by scrolling through a series of on-screen menus with our popular thumbwheel. Setting each individual adjustment is as easy as clicking on a mouse. ScreenManager is another Nanao innovation, and an answer to the growing need for less intimidating technology.

With ScreenManager, Nanao's award-winning family of monitors – featuring ultra high resolutions, sharp edge-to-edge focus, and energy-saving features – are better than ever before. Because they're easier to use. Just think. You don't have to keep looking at your manual for instructions. All the adjustments you need to make are displayed right on the screen. When we developed ScreenManager, we put monitor control right where it belongs – at your fingertips.

NANAO®

Superior In Every Detail

NANAO USA CORPORATION
23535 Telo Avenue, Torrance, CA 90505
(310) 325-5202 Fax: (310) 530-1679
1-800-800-5202

*Superior In Every Detail is a registered trademark of Nanao Corporation.
°ScreenManager displays one menu at a time. ScreenManager available on selected models. °°3 year on T & L, 1 year on CRT. All product names are trademarks of their respective companies. ©1994 Nanao USA Corporation.*

3 Year Warranty**

MVP

to Yes. Do the same for the English Name text box. Finally, disable the usual navigation stuff by right-clicking in the area below the Form Footer bar and in the Properties window, changing Record Selectors to No and Navigation Buttons to No.

Right now the form has a text box for the Product ID—requiring you to type in an ID number. Let's give you a drop-down combo box that lets you either type in the number, or choose it from a list of existing numbers. Click on the Product ID text box and hit Del. Get the Control Wizard going, click on View, and make sure there's a check mark in front of Control Wizards. In the Toolbox, click on the Combo Box tool (it looks like a regular Windows drop-down combo box). Go to where the Product ID text box used to be, and draw in a Combo Box. The Combo Box Wizard pops up. Click on "I will type in the values that I want," click on Next>>, type in 1 for a one-column display, and click on Next>> again. Choose "Remember the value for later use" and click on Next>>. Change the label to Product ID: and click on Finish. You

SUPERSCRIPT — INVENTORY PROGRAM, THE SEQUEL

Continued from page 206

```
            MySet.AddNew
            MySet![Product ID] = [Product ID]
            MySet![Old Units In Stock] = OldNumber%
            MySet.Update
        Else
            If NewNumber% = MySet![Old Units In Stock] Then
                MySet.Delete
            End If
        End If
    End If
    Me![Product ID].SetFocus
End Sub

In btnPrint_Click:

Sub btnPrint_Click ()
    Me.Requery
    Me![Product ID].SetFocus
    DoCmd OpenReport "Inventory Report", A_DESIGN, "Inventory List"
    Reports![Inventory Report]![Employee].Caption =
        Forms![Inventory]![Employee].Column(1) & ' ' &
        Forms![Inventory]![Employee].Column(0)
    DoCmd OpenReport "Inventory Report", A_NORMAL
    End Sub
```

can stretch and move the box as desired.

You'll need another combo box up at the top of the form so each employee can pick his or her name from the list of employees. Again, go over to the Toolbox and click on the Combo Box tool. Draw a Combo Box in the Form Header section. Once again, the Combo Box Wizard will appear. Choose "I want the combo box to look up the values in a table or query" and click on Next>>. Select the Employees table and click on Next>> (if you get a weird message, 15 fields is OK). Click on Next>> three times, selecting the defaults. Choose "Remember the value for later use" and click on Next>>. Change the label to Employee: and click on Finish.

Now you add the two buttons to the form. Click on the Command Button tool in the Toolbox and draw a button near the bottom right of the form. The Wizard appears. On the left pick Form Operations; on the right pick Close Form. Click on Next>>. Choose to display Text and change it to Close. Click on Next>>. Name the button btnClose and click on Finish.

Draw another Command Button in the lower-left corner. Choose Miscellaneous and hit Cancel. We'll write code to handle this one ourselves (see "The Inventory Program," page 206). Right-click on the Command Button and change the name to btnPrint and the caption to Print button.

The Inventory List query shows products in the Inventory Changes table. Back in the Database:INVENTRY window, pick the Query filecard, click on New, New Query. Add the Products and Inventory Changes tables. Click on Close. Click on the down arrow next to Field and pick Products.Product ID. Move to the next column and pick Products.Product Name, then Products.English Name, then Inventory Changes.Old Units In Stock, and finally Products.Units In Stock. Hit Ctrl-S and save the query as Inventory List.

Finally, the Inventory Report—the audit trail—is just a Wizard away. In the Database:INVENTRY window, click on the Reports filecard and then on New. Pick the Inventory List query and click on Report Wizards. Choose Tabular and click

on OK. Select all the fields and click on Next>>. Choose just the Product ID field for sorting and then click on Next>>. Use the Executive report format and click on Next>>. Change the name to Inventory Report, check the "See all fields on one page" option, click on "Modify the report's design," and click on Finish. There's no need to show totals, so down in the Report Footer section, click on each of the =Sum() fields, one at a time, and hit Del. In the Report Header you need something that says Employee: John Smith, so use the Label tool in the Toolbox to add a label with the caption Employee and another label with the caption Unknown. Right-click on the Unknown label, go into Properties, and change the name to Employee.

Save everything, and the next time you open INVENTRY.MDB, your new system will, uh, hatch.

WOODY LEONHARD & VINCENT CHEN

Hoo-boy. Leave your own droppings on PC Contact with Woody at 72241,2125, or Vince at 72241,2221. No cluckin'.

OUR TECHNICAL STAFF RESPONDS

Questions, Answers, and Tips

Trying to get 32-bit access to work but encountering 32 errors too many? We show you how to fix it—or at least explain why your system seems a *bit* confused. We'll even explain 386-Enhanced mode and how TEMP drives work. Plus we answer questions about DOS, Windows, and hardware, and share tips and tricks for your favorite applications.

ACTIVE ACCESS

Question: *When I try to turn on 32-bit disk access in Windows, the option is grayed out, and the virtual-memory dialog box indicates that virtual memory is using the BIOS. My dealer says that this is normal because the system is 32 bits wide. Is that correct, and is there a test I can perform to verify that 32-bit disk access is active? Is my system effectively using SmartDrive?*

LEE GORDON
VIA THE INTERNET

Answer: Windows for Workgroups includes one virtual device driver for 32-bit disk access—WDCTRL—designed for controllers that are compatible with the Western Digital 1003 interface standard. This includes most but not all IDE controllers.

Most SCSI and ESDI controllers, however, are not compatible with this command set. If your controller is not compatible with this command set, the option will be grayed out and you will not be able to enable this option. But all is not lost: Check with the controller manufacturer to see if it has a special driver that will enable this feature.

POWER STRUGGLE

Question: *I've heard that 32-bit disk access is not compatible with the power conservation programs that slow down the hard disk in most portables. I assume that if I turn off power conservation, I won't have*

a problem. Could you explain why portables can't or shouldn't use 32-bit disk access?

FRANK PAGE
JAKARTA, INDONESIA

Answer: When you enable 32-bit disk access, Windows retrieves data from the system's hard disk(s) using an Enhanced mode virtual device driver (VxD), which accesses the controller hardware directly. To function correctly, the disk controller must be completely compatible with the standard Western Digital hard disk controller architecture. In most cases, the Windows Setup and the VxD's own initialization code properly detect controllers that are not 100 percent compatible with the Western Digital standard.

The disk controllers used in portable computers are very similar to Western Digital controllers, but they have extensions used for power management. These include extensions for shutting down the disk drive when it hasn't been used for a while or for placing the machine in Suspend mode (typically by pressing a Suspend button). Some systems, such as Tandon notebook computers, change the state of the disk controller when the power source is changed from the wall plug to the battery. Basically, the power management support can change the state of the disk controller without notifying Windows about this change.

Since there is no standard for this hardware, the 32-bit disk driver

cannot determine when power-management events occur or what to do about them. If the driver determines the controller is in a different state from what it expected, it will produce an error message. If you get this message, you should turn off 32-bit disk access.

If Windows cannot be started in Enhanced mode while 32-bit disk access is enabled, Windows should be started with the command line

WIN /D : F

This switch temporarily disables 32-bit disk access. You should then permanently turn off 32-bit disk access by using the Control Panel's Virtual Memory dialog box. Controllers that support drive spin-down, such as Compaq's DeskPro 386N computers, should not use 32-bit disk access for similar reasons. Note: To avoid problems with these machines, 32-bit disk access is disabled by default. If the machine

MORE FACTS.
MORE FUN.

The new Ford Simulator 6.0. It's like being let loose in a new car showroom!
You have access to the models, options, lease and purchase prices for 1995 Ford and
Lincoln-Mercury vehicles. In the comfort of your home or office, you can determine
the cost to buy or lease any vehicle. You can even change colors.

Questions, Answers, and Tips

Trying to get 32-bit access to work but encountering 32 errors too many? We show you how to fix it—or at least explain why your system seems a *bit* confused. We'll even explain 386-Enhanced mode and how TEMP drives work. Plus we answer questions about DOS, Windows, and hardware, and share tips and tricks for your favorite applications.

ACTIVE ACCESS

Question: *When I try to turn on 32-bit disk access in Windows, the option is grayed out, and the virtual-memory dialog box indicates that virtual memory is using the BIOS. My dealer says that this is normal because the system is 32 bits wide. Is that correct, and is there a test I can*

a problem. Could you explain why portables can't or shouldn't use 32-bit disk access?

FRANK PAGE
JAKARTA, INDONESIA

Answer: When you enable 32-bit disk access, Windows retrieves data from the system's hard disk(s) using an Enhanced mode virtual device driver (VxD), which accesses the controller

cannot determine when power-management events occur or what to do about them. If the driver determines the controller is in a different state from what it expected, it will produce an error message. If you get this message, you should turn off 32-bit disk access.

If Windows cannot be started in Enhanced mode while 32-bit disk access is enabled, Windows should be started with the command line

WIN /D : F

This switch temporarily disables 32-bit disk access. You should then permanently turn off 32-bit disk access by using the Control Panel's Virtual Memory dialog box. Controllers that support drive spin-down, such as Compaq's DeskPro

MORE FACTS.
MORE FUN.

The new Ford Simulator 6.0. It's like being let loose in a new car showroom!
You have access to the models, options, lease and purchase prices for 1995 Ford and
Lincoln-Mercury vehicles. In the comfort of your home or office, you can determine
the cost to buy or lease any vehicle. You can even change colors.

Take the Lake Wakatonka challenge. Also included is an updated version of the
Lake Wakatonka driving game. It's a journey filled with hazards that provides
challenging fun for kids and adults alike.

Order your keys to the fun today! To receive your Ford Simulator 6.0 program,
simply fill out the attached order form and return it in the postage-paid envelope
with $7 (check, MasterCard or Visa). Specify your choice: DOS VGA and
Windows VGA capabilities for diskette or CD ROM. If you have any questions
regarding the Ford Simulator 6.0 disks or the hardware needed to run them,
please call toll-free 1-800-322-1786.

Ford

is not a portable and does not support spin-down, then feel free to enable 32-bit disk access.

32-BIT SOMETHING

Question: *Every time I try to run 32-bit disk access, I get the following error when I start Windows: "The Microsoft Windows 32-bit disk driver (WDCTRL) validation failed at phase 07,1F. To continue starting Windows without using the 32-bit disk driver, press any key."*

I have a Gateway 2000 Pentium P5-66 system with a 540MB Western Digital hard drive running Windows for Workgroups 3.11 and DOS 6.21. Can you tell me how I can avoid the 32-bit error?

VINCENT FISHBAUGH
SALT LAKE CITY, UTAH

Answer: When you run Windows for Workgroups 3.11 with 32-bit disk access enabled on a Gateway 2000 P5-60 with a 540MB IDE drive, you may receive a message that's similar to the following:

"Microsoft Windows 32-bit disk driver (WDCTRL) validation failed at phase 03,OF."

This message also pops up on the Gateway 2000 P5-66 at phase 07,1F. This situation occurs if your CMOS drive configuration settings are set to AUTO-CONFIG. To correct this problem, you have to manually set your CMOS drive configuration parameters. Check your system's user guide for how to configure CMOS settings. Unfortunately, there's no universal CMOS configuration procedure that we can offer here.

BREAKING THE CODE

Question: *I'm trying to follow the examples of code you've published, in various previous issues, for writing a batch file. But I'm not sure how you handle the following symbols:* ⌐ ⌐

BARRY RYAN
TACOMA, WASHINGTON

Answer: We tried our best to come up with a visual icon that depicted a

"wraparound" of characters. These symbols indicate that although the code appears to break into two or more lines—as represented in the columns on *PC Computing*'s pages—the reader should type in the code as a single line.

VIRTUAL ACCESS

Question: *Thanks for printing the Windows Superguide in your October 1994 issue (page 101). It ironed out all the rough spots in my setup. But I still have a question: What is 386-Enhanced mode?*

NAME WITHHELD
VIA COMPUSERVE

Answer: Windows 386-Enhanced mode is the normal operating mode for a system that has a 386 or later processor. It allows Windows to access virtual memory—which means more memory than what is physically installed in the machine. It also provides a means for Windows to multitask non-Windows applications and run DOS applications in a window on the desktop alongside other Windows applications.

JUST SAY ICON

Question: *Is it possible to change the minimized icons for Program Manager groups? It would be so*

Not everyone knows that Lotus 1-2-3 Release 5 offers a handy map feature. This makes it easy to create a map that uses colors to illustrate state-by-state statistics. Lotus 1-2-3 automatically recognizes state names and knows how to organize them.

1. Columnize: Put your state data into a two-column range. (This example includes data for the 48 contiguous states, plus the District of Columbia.) Select the entire range. Do not, however, include the column headings at the top in your selection. If you do, 1-2-3 will interpret them as state names.

2. Oh, Goodie: Display the Goodies Smartlcon set and click on the New Map tool. (Alternatively, you can choose Tools, Map, then choose New Map from the submenu that appears.) This transforms the mouse pointer into a spinning globe. Click in the upper-left corner of the worksheet where you want to place the map.

3. Title: The resulting map has the uninformative title, "USA by State." To remedy this, choose Tools, Map, then choose Ranges & Title from the submenu that appears. In the Ranges & Title dialog box, click the Cell check box, enter A1 in the Title box, and click on OK.

4. Colorize: The label in the selected cell provides the map title text, as shown here. Lotus 1-2-3 automatically divides the states into six strata and assigns a different color to each.

Increase in Household Income

RALPH SOUCIE
WINTERPORT, MAINE

WHAT KIND OF

EVIL-MINDED

SLIMEBALL

REPORTS THEIR

SMALL BUSINESS

COLLEAGUES FOR

ILLEGALLY

COPYING

SOFTWARE?

When people call the SPA to turn in

someone for illegally copying software,

they do so because they know that when

dishonest people steal software, the rest of

us end up paying for it. Copying software

is a crime. To clean up your software, or

report someone who should, call

1-800-388-7478.

**SOFTWARE
PUBLISHERS
ASSOCIATION**

DON'T COPY THAT FLOPPY.™

much easier on my eyes if I could glance down and recognize a fax machine icon to tell me where my communication programs are located.

ROBERT T. BAXTER
RATHDRUM, IDAHO

Answer: That is not an option with Windows as it comes out of the box. However, there are some third-party applications that allow you to change the group icons on your desktop. Our favorite is Plug-In Version 2 from Plannet Crafters. For information, contact the company at (404) 998-8664 or (800) 651-1000.

NOT SAFE TO A POINT

Question: *I have received conflicting advice about pointing the TEMP variable to a RAM drive. Is this something I can safely do?*

MADHAV G. WELLING
SHERMAN OAKS, CALIFORNIA

Answer: The reason you get conflicting answers is that there are two ways of looking at this issue. You can set your TEMP drive to point to a RAM disk to increase performance, since RAM access is faster than hard disk access. In addition, when your system locks up, you won't get stuck with cryptic TMP files on your hard disk because these files will get erased when you exit Windows, or when you finally turn your computer off.

However, the extra memory would be better used to increase SmartDrive or 32-bit file access under Windows for Workgroups 3.11.

KEEP ON UPGRADIN'

Question: *I recently upgraded my computer from a 386DX to a 486SX. Is there any way I can use the 386's math coprocessor to turn the 486SX into a 486DX?*

WAYNE EDWARDS
COLORADO SPRINGS, COLORADO

Answer: Unfortunately not. When a 486 processor offers a math coprocessor, it's built inside the chip—alongside the processor unit—to improve performance. In the 486SX, the math coprocessor has been omitted altogether to reduce cost. To add a math coprocessor to a system with an Intel 486SX chip, you must install a whole new chip, which includes both the processor and the math coprocessor unit. This plugs directly into a socket on the system board, next to the existing processor in the system.

MIGHTY MODEM

Question: *I'm about to move to Russia. Can you recommend any brands or models of modems that would be tough enough to stand up to Russia's faint and noisy phone lines?*

PETER ARONSON
GERMANTOWN, TENNESSEE

SHEA, KUFFEL & KLASHKE

Answer: Any modem manufacturer who wants to sell a modem for use in a country outside the United States must have its modem certified by that country's phone company. This is because many European countries have different line voltages and connectors, and their phone subsystems could be damaged by unauthorized equipment sending power down the wrong lines.

You should look for modem manufacturers with experience selling in the international markets. We suggest contacting U.S. Robotics, a company that has sold modems in the Russian market for many years. Check out the popular Sportster and Courier models.

Compiled and edited by James Cury. *Additional technical assistance was provided by* Matthew Lake, Yael Li-Ron, Adam Meyerson, Scott Naylor, *and* John Taschek.

PCComputing

It's PC/Computing CD-ROM Edition—the ultimate multimedia companion that takes full advantage of the awesome possibilities of CD-ROM technology. It's a state-of-the art computing resource and the perfect complement to your printed issues of PC/Computing.

You've never seen anything like it...because there's never before been a CD-ROM that's this cutting-edge...this informative...this easy-to-use...or quite this cool. You'll marvel as the pages of PC/Computing literally come to life before your very eyes!

Grab hot facts on hot new products.

Or dig deeper into our review section for the full details. Either way, you get the information you need to make better buying decisions. Our reviews practically jump off the page— with interactive charts, full-motion video, performance ratings, usability rankings, technology appraisals and more.

Interact with our editors and columnists.

Why just read PC/Computing when you can experience it! Duke it out with our editors in a one-on-one, interactive "Cyber-Debate" on today's controversial computing issues. Pick their brains. And if they're full of it...tell 'em so! It's your chance to challenge Dvorak, Bott and the gang...and see and hear them react to you!

Experience entertaining CD-ROM reviews.

Move over Siskel and Ebert! Now PC/Computing's very own Ron White is taking a shot at the small screen. You'll see actual clips from his best bets from the thousands of CDs now on the market—and you'll discover which CD-ROMs are better left alone. Two thumbs up!

IT'S NOT JUST REVIEWS...IT'S NOT JUST

IT'S NOT JUST REVIEWS

Help: Buying Smarter
The Quantum Leap to Data Recovery

A time machine would be the perfect backup system. Ideally, as soon as the embers of your now-burned-down office have cooled, you'd simply dial into yesterday, tuck your PC under your arm before you leave the office, and wait for today to come. Until time machinery makes it to market, though, you'll have to depend on a backup system to prevent simple PC problems from becoming disasters. Although hard disks are more reliable than ever, unexpected demons lurk nearby, waiting to corrupt your files and data. They come in the form of mistyped delete commands, viruses, thieves, natural disasters, and all the other potential nightmares that rob you of sleep.

But backing up is a drag, particularly when you oversee several PCs. So you sacrifice your creative work to make copies of work you've already completed—copies you may never look at again. Fortunately, there are many kinds of backup technologies, and at least one of them will match your working style. Your choices include: floppy disks, duplicate hard disks, cartridge disks, magneto-optical disks, CD-ROM (and other WORMs), quarter-inch cartridge (QIC) tape, data cartridge tape, helical tape (DAT and 8mm), and tape libraries.

Classic among backup systems is the archaic floppy disk. Its main advantage: It requires nothing new. Almost every PC has a floppy drive, and backup software comes with DOS. However, although the media are cheap, today's preferred 1.44MB floppies aren't suitable for backing up 200MB to 400MB hard disks. One full backup would require several hundred floppies, several hours, and health risks—like tennis elbow from changing floppies, or lacerations from putting your foot through your monitor when the session aborts on disk number 302.

A faster solution is a second hard disk drive. With disk mirroring software or a mirroring controller, such as the Distributed Processing Technology (DPT) Smart-Cache III Model PM2122, which combines a Fast SCSI-2 interface and an EISA bus connection, the second hard disk becomes a RAID 1 disk array. Higher RAID levels (4 and 5) secure information in a more efficient manner, improving performance and letting you operate without data loss, even when one of several drives fails.

Disk cartridges such as the fast floppy-like Bernoulli MultiDisk Insider 150 from Iomega Corp. (150MB per cartridge) or the SyQuest Technology SyQuest 270i (270MB capacity) give you the fast access of hard disks in cartridges that you can store offsite or use as an exchange medium.

Magneto-optical (MO) cartridges are slower, but widely supported. Big 5.25-inch cartridges like the Pinnacle Micro Sierra 1.3GB store more than a gigabyte per disk, while pocket-size 3.5-inch cartridges like Pinnacle's Tahoe 230 pack 230MB per disk.

Some backups must be immutable as well as secure, to preserve archives or evidence, for example. A recordable CD-ROM drive is suitable for that kind of backup.

Staple Media Tape cartridges have long been the backup standby because they are inexpensive, reliable, and easy to use. One cartridge can back up an entire

network with minimal effort. The backup system for individual PCs has long been QIC-80 minicartridge tape. Although originally designed to store 80MB per cartridge, putting 50 percent more tape in each cartridge and adding data compression has pushed capacity to about 250MB. Among dozens of drives, we like Colorado Memory Systems' floppy-interfaced Jumbo 250 and parallel-port Jumbo Trakker 250.

Today, however, the standard hard disks have grown to twice that capacity without resorting to data compression. To that end, Sony Corp. has added 68 percent more capacity by squeezing wider tape into QIC-Wide cartridges—the new "quarter-inch" cartridges hold tape measuring 8 millimeters (0.315 inch) across. The capacity of a single QIC-Wide cartridge starts at 200MB uncompressed and runs up to 4GB using advanced tape coatings and data compression. Surprisingly, the wider tape doesn't fatten prices. The first available QIC-Wide internal drive is the Conner Tape-Stor 420.

Larger QIC data cartridges currently pack several gigabytes of data. Although today's technologies top out at about 13GB, tape-maker 3M Company and drive-maker Tandberg Data are currently

working together to put 25GB on a single 1,500-foot cartridge with a system scheduled for introduction later this year. (See "Crossroads: QIC vs. DAT," page 188, for more information on these technologies.)

Helical Tapes Competing with QIC tapes at capacities over a gigabyte are two technologies, DAT (digital audio tape or 4mm tape) and 8mm cartridges.

The tiny, matchbox-size DAT cassettes follow one of two standards: the 1990 DDS (digital data standard), which packs up to 2MB in a 90-meter cassette, or the 1993 DDS-2, which doubles speed and capacity using 120-meter cassettes. (We liked Optima Technology's MiniPak Fast 8000DAT best.) Current 8mm cartridges store 5GB to 7GB per tape; the higher capacity uses longer, thinner tapes and special drives like Exabyte Corp.'s EXB-8505XL.

If you have more data to back up than that, you'll need a library—a robotic

multiple-tape jukebox. A single library puts terabytes of data in automatic, near-line (electronically accessible, but not instantly so) storage using a carousel of dozens or hundreds of tapes and one or more drives. These back up your network automatically and make restorations without a human handling a tape. But be prepared to pay from $60,000 to $850,000 for these.   WINN L. ROSCH

BACKUP BLUES

The Problem
Backing up 60MB databases onto floppy disks took over an hour. If the backups were unreliable, more time was wasted in a fruitless restoration.

1. Swap Team: Operator shuffles floppies in and out of drive. The low transfer speed (peak rate of about 125KBps) makes the backup process time-consuming.

2. Handle with Care: Floppies are shipped to client. Fragile media may suffer physical damage during shipping and handling.

3. Pray: Client tediously restores backup to hard disk. One CRC error renders a 60MB backup unusable because all floppies in a session are interdependent.

GENERAL FAILURE ERROR READING DRIVE A:

C:\COPY C:\MARCH95 A:

March 1995
Disk 36 of 36

FIT MORE MEGABYTES INTO EVERY TAPE

Putting the Squeeze on Your Backup Tapes

Backup systems face a challenge as frustrating as chasing the horizon: How to squeeze enough data onto a single cartridge to back up a full hard disk. Every year or two, the disk capacity of the typical hard drive doubles, and tape vendors must follow suit. The easy solution? Put more tape in a cartridge. Or use thinner tape, a strategy that stretched

DAT cassettes from 1.38GB up to 4GB.

Now try squeezing more data on the same amount of tape. Fortunately, geometry works in favor of tape manufacturers. Figuratively speaking, a data stream is one dimensional (length), while tape exists in two dimensions (width and length). As a consequence, tapes can be split into multiple tracks.

Designing those tracks on the tape isn't the big challenge. The problem is reading and writing to them with a tape head. Every track in a head requires a pole piece—a tiny electromagnet with iron laminations and a long electrical coil. Putting dozens of poles into a single head is a monumental chore—and it costs.

Luckily, it's also unnecessary. Only a few mainframe systems read or write multiple tracks simultaneously. Most PC tape drives need only one track at a time. In QIC systems, the read/write head moves up and down (perpendicular to the tape) to find each track, shifting to the next position as the tape reaches the end of its travel.

In fitting dozens of tracks across a

tape, manufacturers resorted to the same technique that's used on disks—servocontrol. The drive checks for control data on the tape—data that helps the drive adjust the head position to follow each track as the tape travels.

To guarantee smooth tape flow, QIC cartridges are built with a huge aluminum armor plate to keep tape and spools aligned. A special rubber-belt drive mechanism ensures constant tape speed.

The QIC cartridge mechanism is costly, yet still doesn't squeeze in all the tracks that might fit across a tape. So some designers stole an idea from the world of videocassette recorders. Instead of packing tracks lengthwise along the tape, the helical scan method traces them diagonally and packs tracks at more than 1,500 per inch. As with high-density QIC cartridges, helical systems rely on embedded servo information to find each of these narrow tracks.

Offset Data Tracks Instead of moving the head up and down to scan the tracks, a helical scan recorder spins two heads inside a large drum, around which

the tape wraps. As one head spins around the drum and across the tape, the tape moves slightly. When the first head reaches one edge, the second head starts a similar sweep at the other edge following in the first head's tracks—almost. Because the tape moves slightly in the time the first head makes its scan, the second head's traverse is offset slightly from the first.

Usually a narrow guard band separates the tracks of the first and second heads. To squeeze data tighter, some helical systems use azimuth recording, which slightly overlaps (instead of separating) the tracks. To distinguish adjacent tracks, gaps in each of the two heads are tilted in opposite directions from each other. Because a head responds most strongly when the azimuth of the recording matches the azimuth of the head, one head ignores the track laid down by the other head.

The rotating head of the helical system offers another advantage. It increases the apparent tape-to-head speed, which in turn increases the frequency with which the drive can apply data to the tape, speeding up the data transfer rate of the overall system. The new 8-millimeter systems achieve the highest data rates of any tape backup system.

Error Correction As the density of the data on a tape increases, so does the likelihood that something could go wrong. But error rates quoted for tape backup systems are microscopically small—errors are less likely to occur in data on tape than on your hard disk drive.

How to Choose: The backup media you pick depends on the amount of data you generate. The more data, the more comprehensive your backup strategy should be. Minicartridges offer low-cost answers to individuals. For larger backups, DAT cassettes store more data and libraries can automate your backup routines. For backup across a LAN, you can increase your ROI with a tape carousel that automates the procedure.

PICKS WHICH **BACKUP STRATEGY** WORKS FOR YOU?

1 What kind of system?	**2** Your best backup technology is	**3** Here's what the system gets you . .
Individual PC	QIC-80 Minicartridge Tape	250MB capacity at $20 per tape
Small- to Mid-Size LAN	DAT Cassettes	Up to 8GB for around $2,500
WAN or Data Center	Library (Multiple-Tape Jukebox)	Unlimited storage, automated backup

The Recordable CD-ROM Solution

Need to write hundreds of megabytes of data for playback on many PCs? Although less durable than regular CD-ROMs, recordable CD-ROMs cram data onto a disc that you can play on a regular CD-ROM drive.

Pro: Playback drives—CD-ROMs—are everywhere.

Con: An expensive platform to adopt; not rewritable.

1

Pit
Land
Laser Beam

1. Prepare to Write: The recordable CD-ROM drive translates streams of data copied from your hard disk into flashes of laser light that are focused onto a spinning recordable compact disc. The laser burns holes in parts of the gold layer inside the disc. The holes (called pits) and intact portions of the coating (called lands) represent the 1s and 0s of binary data.

Prism

2

2. Read and Write: The data—written in a spiral fashion moving toward the center of the disc—is usually read back for verification purposes in much the same way a regular CD-ROM is read. A laser that's less bright than the beam that writes data reads it by flashing onto the data track and being reflected back through a prism onto a light-sensing diode.

3. Partial Write: Although you can't rewrite a CD-ROM using a CD-R drive, you can record more than one session on most of them. To do this, the drive adds header information to the outside of the disc to show where the new session begins, and then moves the write head to that free location and continues to burn data into the gold layer of the disc.

The Magneto-Optical Solution

For a durable, portable medium that you can write on and rewrite over, magneto-optical (MO) drives are an expensive but high-volume medium. The disks consist of aluminum and alloy layers sandwiched between a protective plastic coating. The drive uses both lasers and electromagnets to record data.

Pro: It's a rewritable medium. Disks have a protective shell to prevent scratches.

Con: Expensive, limited availability of playback hardware.

1

Laser

1. Prepare to Write: An intense laser beam shines on the spinning magneto-optical disk, softening up the alloy layer to a point where it can be manipulated magnetically. At normal temperatures, the alloy is stable, which makes it a much more durable medium than the magnetic coating on floppy disks or hard disks.

2. Write: A magnetic write head trailing the laser beam polarizes the softened alloy, charging its particles with positive or negative magnetic polarity for the 1s and 0s of binary code. Since only the alloy that has been softened is magnetized, the tracks on a magneto-optical disk can be very tightly packed, fitting upwards of 1.3GB on a single disk.

Electromagnets
1001
Laser Beam

2

BY MATTHEW LAKE

Tape drive designers use three technologies to ensure that what you store on tape is reliable and error-free. These include error correction codes (ECCs), preformatting, and read-after-write verification.

Error correction is based on statistics—error probabilities rise geometrically rather than linearly. By ensuring redundancy—through duplicating the data—you can more than double your data's security.

Coding Data Saves Space Complete redundancy also wastes space on the magnetic medium. And it's unnecessary. By properly coding the data, a few bits can monitor the condition of many.

Correcting errors requires more bits than does simple detection, but needs fewer bits than complete redundancy. The more bits devoted to an ECC, the greater the number of errors it can correct in each block. For example, by layering ECC with parity checking, minicartridge systems can fix up to three errors in a block of data.

Although that's fine for bit-level errors or a pinhole in the tape, the scheme falls apart with gross errors. A particle flaking off the tape may shed dozens of data bits, which ECC can't repair.

Testing for Big Errors To detect large errors, inexpensive tape systems rely on qualifying each tape before they entrust your data to it. The initialization process used by familiar QIC-80 minicartridges formats the tape with blocks corresponding to disk sectors, tests the tape, and removes bad blocks from use. Unfortunately, this process is time-consuming. Initializing a QIC-80 cartridge can take nearly an hour.

High-end tape systems, including nearly all data cartridge, DAT, and 8-millimeter drives, provide a fail-safe check of every bit using read-after-write technology. The drive writes a bit onto the tape, and then it reads the bit off again to verify that the bit was written into the magnetic medium.

Most read-after-write systems work at the bit level, monitoring the bits on the tape without regard to what they mean. Better systems check more deeply. For example, Exabyte's 8-millimeter systems read what's written from the tape, decompress the data, and then compare it to the original data supplied to the drive.

Read-after-write technology adds to the cost of a tape drive. It requires separate writing and reading heads as well as extra electronics to allow the write and read operations to occur simultaneously.

Most inexpensive minicartridge tape systems avoid the extra cost by simulating read-after-write technology with tape verification. To verify a tape, a drive rewinds the tape and compares an entire completed backup to the original files. But verification doubles the time required for backing up. Most tape manufacturers make verification an optional part of each backup session so that you can avoid the extra wait.

WINN L. ROSCH *is a contributing editor to* PC Computing *and the author of the* Winn L. Rosch Hardware Bible *(Sams).*

BUYER'S GUIDE STORAGE OPTIONS

Mass Media: Prices range from $155 to nearly $60,000, covering every backup and storage need on a variety of media.

Product	Hard-Disk Mirroring Utility	Removable Cartridge Disk	Magneto-Optical Disk	QIC Tape	Digital Audio Tape	Capacity/Price
Bernoulli MultiDisk Insider 150 Iomega Corp. (800) 777-6654 *Reader Service No. 724*		✔				150MB/ $465
Jumbo 250 Colorado Memory Systems (800) 845-7905 *Reader Service No. 725*				✔		250MB/ $155
Mammoth 186GB Pinnacle Micro (800) 553-7070 *Reader Service No. 726*			✔			186GB/ $59,995
MiniPak Fast 80000AT Optima Technology Corp. (714) 476-0515 *Reader Service No. 727*			✔			8GB/ $1,873
Sierra 1.3GB Pinnacle Micro (800) 553-7070 *Reader Service No. 728*			✔			1.3GB/ $2,800
SmartCache III PM2122 Distributed Processing Technology (407) 830-5522 *Reader Service No. 729*	✔					NA/ $496
SyQuest 270i SyQuest Technology (800) 245-2278 *Reader Service No. 730*		✔				270MB/ $385
Tahoe 230 Pinnacle Micro (800) 553-7070 *Reader Service No. 731*			✔			230MB/ $999
Tape-Star 420 Conner Peripherals (800) 426-6637 *Reader Service No. 732*					✔	420MB/ $199
Trakker 250 Colorado Memory Systems (800) 845-7905 *Reader Service No. 733*					✔	250MB/ $269

THE ROI OF RECOVERABLE DATA

Backup Is Your Data's Life-Insurance Policy

What's the problem with backing up our PCs? Everybody knows it's important, so how come nobody takes it seriously? I recently ran into a colleague sporting a long face. He explained that his 300MB hard drive had gone to the great computer store in the sky. So I asked him how old his backup data was. Silence. He doesn't

back up—period. Now, this guy is not a dolt. He eats bytes for lunch. He just felt lucky. This represents the victory of laziness over fear. Sound familiar?

Better Back Up The return on investment (ROI) of backup involves two stories. One deals with the mechanics of selecting the right device. The second (and more important) story deals with establishing procedures for backing up and deciding how and where it will be done.

Selecting the backup tool that's appropriate for your needs is the easy part. Justification is also straightforward: Compare the cost of the backup hardware to the cost of replacing the data.

The hard part is training people to use the equipment. While writing this column, my $6,200 ThinkPad rolled over and played dead like a six-pound basset hound. No problem. My mother didn't raise any stupid children. I'd had my system backed up just two days earlier.

Proud of myself, I asked the LAN administrator to restore the data on a loaner PC. He had also run the backup. I watched in terror as he struggled to restore the data. The software was gagging on the tape and my stomach was filling with acid. Excuse me, Mr. LAN administrator, I asked, but did you read/verify the tape during the backup? "Oh no, that takes too long."

So I recovered my data from an earlier tape backup and floppy disks. This single-user disaster cost my company $1,100 in lost productivity. Data disasters put people out of work. Recovering that work—and replacing the people who do it—is much more expensive than backup hardware.

Mainframe people see backup, network management, security, and database

administration as ways to regain control of the crown. They have some good points, too. Most departmental servers and workstations are poorly administered. The data center offers trained staff, disaster recovery, hardware, funding, and security. The people there also understand the problem. After all, they've had three decades to make our lives miserable. The PC and LAN folks have less than one decade's worth of experience screwing things up.

However . . . Central backup definitely makes sense for data stored on the mainframe, but does it make sense for geographically distributed computing sites? Do we want to back up a server in Los Angeles at headquarters in New York?

There are also some tangible reasons why distributed backup must be decentralized, at least for the short term. Most

companies cannot back up all of their enterprise servers across the network without an expensive retooling. Also, mainframe storage hardware is expensive and floor space costs even more.

All of us are struggling with application interconnectivity in general. Why should backup be any easier? We'll need tools for central backup that function independently from the processor and the operating system. Stand in line.

Train Your Staff Backup is pinhead pabulum for diehard data-center types. My experience is that users and local support people are trainable. It takes a long time, but it can be done. The best strategy today is to back up corporate data centrally and department and personal data locally.

Regardless of which backup scenario plays out, you should purchase hardware with a payback period of three years or less. If the centralized strategy pans out, you will have to buy new technology that is not available today. In fact, the three-year rule holds for most PC-related purchases. My ThinkPad should last so long.

MARC DODGE, a telecommunications department manager, is a regular contributor to PC Computing.

ROI IT'S EASY TO RECOVER THE COST OF **BACKUP SOLUTIONS**

LEAST PAIN ▶

- Digital Audio Tape
- Removable Cartridge Disk
- Duplicate Hard Disk
- QIC Tape
- CD-ROM
- Magneto-Optical Disk
- Second PC
- Floppy Disk

Higher Productivity ◀ ... ▶ MOST GAIN
Lower Cost ▶

Cost Justify: When it comes to protecting your company's lifeblood—data—cost is a slippery subject. The price of most backup technologies reflects their storage capacity and reliability.

QUESTIONS?
HERE'S HOW TO REACH US FOR QUICK ANSWERS...

Need to change your address? Wondering when your subscription expires? Want to order back issues? Renew? Give a gift subscription?

If you have any questions about your subscription to *PC/Computing*, just let us know. We're here for you. And we'll get you the answers you need...or the service you want — fast!

CALL, WRITE OR FAX US! HERE'S HOW:

BY PHONE:
In the United States and Canada,
call TOLL FREE: 800-365-2770
All other countries, call: 303-447-9330

BY FAX:
Outside the United States and
Canada only: 303-443-5080

BY MAIL:
PC/Computing
P.O. Box 50253
Boulder, CO 80322-0253

PCComputing

Direct to You

- Your Guide to Navigating the Direct Channel
- Thousands of Products to Choose From
- Service and Support Are a Phone Call Away
- Hardware, Software, Peripherals, and More

SPEC WATCH | **Graphics Accelerators**

See the Light More colors, higher resolution, faster redraws—are they worth the investment in a graphics accelerator? You bet your poor, strained eyes they are. But which one should you buy? Do you have a VESA, PCI, or ISA bus? And do you need full-motion video, 3-D, or expandability options? Adam Meyerson tells you which features to look for. **233**

Spec Watch Before your next hardware investment, check out our recommended specs:

Desktop Systems....234
Portable PCs 234
CD-ROM Drives.......235
Network Servers......235
Laser Printers 236
Monitors 236

Direct to You ADVERTISERS' INDEX

VENDOR NAME	PAGE NO.	HOURS OPEN	800 NUMBER
SYSTEMS			
Computer Discount Warehouse	265-67	M-F 7:30-7:30; Sat 9-5 (CST)	800-473-4CDW
Insight	274-75	24 Hours	800-998-8044
Midwest Micro	238-46	M-F 9-7; Sat 10-4	800-682-7248
PC's Compleat	255-57	M-F 24 Hours; Sat-Sun 8-8 p.m.	800-598-4727
PC Zone	278-79	24 Hours	800-252-0386
Quantex Microsystems	246-50	M - Sat 9-9	800-787-8686
Samsung Direct	268-69	M-F 6-9 , Sat 8-4 (MST)	800-755-3894
USA Flex	264	M-F 24 Hours; Sat-Sun 9-4	800-723-0334
PERIPHERALS			
Arlington Computer Products	276	M-F 7:30 - 7:30; Sat 9-5 (CST)	800-548-5105
Computer Discount Warehouse	265-67	M-F 7:30-7:30; Sat 9-5 (CST)	800-473-4CDW
First Source International	270	M-F 8-5; Sat 9-3 (PST)	800-474-9866
Insight	274-75	24 Hours	800-998-8044
L.A. Trade	260	M-F 8-5; Sat 10-12 (PST)	800-433-3726
Megahaus	254	M-F 8-7; Sat 9-3(CST)	800-786-1187
Midwest Micro	238-46	M-F 9-7; Sat 10-4	800-682-7248
PC's Compleat	255-57	M-F 24 Hours; Sat-Sun 8-8 p.m.	800-598-4727
PC Zone	278-79	24 Hours	800-252-0386
USA Flex	264	M-F 24 Hours; Sat-Sun 9-4	800-723-0334
PRINTERS			
Arlington Computer Products	276	M-F 7:30 - 7:30; Sat 9-5 (CST)	800-548-5105
PC Zone	278-79	24 Hours	800-252-0386
Sunshine Computers	232	M-F 9-9; Sat 10-6; Sun 12-5 (EST)	800-854-7754
USA Flex	264	M-F 24 Hours; Sat-Sun 9-4	800-723-0334
SOFTWARE			
Computer Discount Warehouse	265-67	M-F 7:30-7:30; Sat 9-5 (CST)	800-473-4CDW
First Source International	270	M-F 8-5; Sat 9-3 (PST)	800-474-9866
Insight	273	24 Hours	800-535-1530
MEMORY			
Arlington Computer Products	276	M-F 7:30 - 7:30; Sat 9-5 (CST)	800-548-5105
First Source International	270	M-F 8-5; Sat 9-3 (PST)	800-474-9866
L.A. Trade	260	M-F 8-5; Sat 10-12 (PST)	800-433-3726
PC Zone	278-79	24 Hours	800-252-0386
WorldWide Technology	237	M-F 9 -7:30; Sat 10-6	800-636-6792
ON-LINE SERVICES			
Compuserve	261-63	M-F 7am-1am, Sat 12-5pm (EST)	800-848-8199
NOTEBOOKS			
Arlington Computer Products	276	M-F 7:30 - 7:30; Sat 9-5 (CST)	800-548-5105
Insight	268-69,273-75	24 Hours	800-927-3159
Midwest Micro	238-46	M-F 9-7; Sat 10-4	800-682-7248
MPC Technology, Inc.	273	M-F 9-6; Sat 9-3	800-672-8808
PC's Compleat	255-57	M-F 24 Hours; Sat-Sun 8-8 p.m.	800-598-4727
PC Zone	278-79	24 hours	800-252-0386
SAGER	258-9	M-F 7-6; Sat 9-3 (PST)	800-669-1624
Sunshine Computers	232	M-F 9-9; Sat 10-6; Sun 12-5 (EST)	800-854-7754
USA Flex	264	M-F 24 Hours; Sat-Sun 9-4	800-723-0334
STORAGE			
APS Technologies	277	24 Hours - 7 days a week	800-925-4935
First Source International	270	M-F 8-5; Sat 9-3 (PST)	800-474-9866
Insight	275	24 Hours	800-998-8044
TRAINING PROGRAMS			
Computer Book Club	281-83	M-F 8-5	717-794-2191
NRI Schools	252-53,271-72	M-F 8-5 (EST)	202-244-1600

DIRECT
Buying Guide

Empowered Buyers Buy Direct

Buying direct has many advantages. You can call a number of vendors, compare products, prices, service and support — all through the pages of PC Computing. Direct vendors offer mainstream products at competitive prices. Warranties and service contracts eliminate the fact that a company may be located a few states away. And shipping can be virtually instantaneous.

What do you need to know to buy direct? PC Computing gives you a wealth of timely and relevant information on the latest techologies and products, on how products will affect your productivity and on choosing a product and brand to purchase. If you have questions, direct vendors welcome the opportunity to answer them. Consider your call to the vendors appearing in these pages a consultation session, where salespeople and telemarketers advise you on products that best meet your specific computing needs.

The bottom line is that you never have to buy until all of your questions are answered, your needs are met and your concerns addressed. Many PC Computing readers reach this state every month — which has resulted in this robust and vital section.

This new page in our **Direct to You** section is a tool for direct shoppers to call out some highlights from a few of the ads in the the section. We hope it helps you navigate Direct to You and inspires you to call.

WorldWide Technologies

Buy with confidence from the memory upgrade experts. Personal computers, work stations, notebooks, laser printers. Great services. Fast delivery. Super selection. Big savings. Lifetime warranty/money back guarantee. Call **WorldWide Technologies** at 1-800-636-6792 and see their ad on page 237.

USA FLEX

Mail order made easy by...**USA Flex**. Look at these prices! IBM ThinkPad 360C for only $2399. Creative Labs Digital Schoolhouse multimedia upgrade kit, just $299. Or a Hewlett-Packard HP 4L Printer for only $499! Purchase name brands for less when you shop with USA Flex, 1-800-723-0334. See their ad on page 264.

Insight

Directory assistance—who needs it? Not when you can locate 80 million homes and businesses right from your desktop! Have the world at your fingertips with the hottest selling phone books on CD-ROM, available through **Insight Direct**. See their ad on pages 273-275 and 268-269 and call 1-800-535-1530. Say hello to Insight and good-bye to dialing 411.

First Source International

If memory is what you're after, look no further than **First Source International**—the upgrade experts. Find their ad on page 270 and check out those prices! We can't remember when it cost less for laptop, notebook, personal computer and laser printer memory. Call First Source International today at 1-800-516-9866.

FOR YOUR EYES ONLY

Graphics Accelerators: Vroom!

Stop squinting and lay off the aspirin. If you're relying on a $70 video board to produce the images you stare at for hours every day, you should treat yourself to a better display. Like a new coat of paint on a weather-beaten car, the right video card can turn your old headache-inducing, eye-burning monitor into a feast for the eyes. With the flood

of applications from business graphics to multimedia and videoconferencing, a graphics card isn't enough anymore. What you need is a local-bus graphics accelerator, packed with memory, capable of resolutions from 640 by 480 to 1,280 by 1,024 pixels, all at 16.7 million colors. More memory isn't always better. So configure your card's memory to match up with your monitor. For example, a 15-inch monitor is best suited for 800-by-600-pixel resolution. With 938K
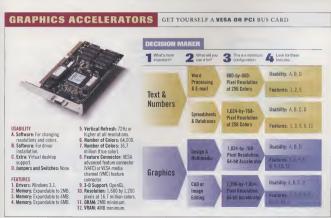
of RAM you can run 800 by 600 with 64,000 colors, so 1MB is your best choice. A 17-inch monitor can easily handle a resolution of 1,024 by 768, but you'll need 1.5MB of RAM to get the same 64,000 colors. So plan on 2MB. For a complete chart of video memory configurations, download VCHART.ZIP from PC Contact's data library 8 (Misc.). See page 316 for information about how to log in to PC Contact.

Video memory comes in two flavors:

VRAM and DRAM. If you use 1,024 by 768 at 256 colors or fewer, stick with DRAM. But for working at higher resolutions with greater color depth you'll want the faster, dual-ported VRAM.

Local-bus architectures (VESA or PCI) are 32-bit buses that provide an enormous speed boost over 16-bit ISA. So if you're deciding on a new system, make sure it has a local bus. While there is a battle raging over which bus is better, most of the 64-bit accelerators (the onboard accelerator chip is 64-bit) are available in both flavors.

To avoid flicker, make sure your video card's vertical refresh rate is at least 72Hz at all resolutions. And look for Windows 3.1 drivers that can handle resolution changes on the fly without exiting Windows. Finally, if you need full-motion video, look for a board that accelerates video playback as well. **ADAM MEYERSON**

GRAPHICS ACCELERATORS
GET YOURSELF A **VESA OR PCI** BUS CARD

DECISION MAKER

1 What's more important?

2 What will you use it for?

3 This is a minimum configuration:

4 Look for these features . .

Text & Numbers

Word Processing & E-mail	800-by-600-Pixel Resolution at 256 Colors	Usability: A, B, D Features: 1, 2, 5
Spreadsheets & Databases	1,024-by-768-Pixel Resolution at 256 Colors	Usability: A, B, C, D Features: 1, 3, 5, 6, 11

Graphics

Design & Multimedia	1,024-by-768-Pixel Resolution, 64-bit Accelerator	Usability: A, B, D Features: 1, 3, 4, 6, 8, 9, 10, 12
CAD or Image Editing	1,280-by-1,024-Pixel Resolution, 64-bit Accelerator	Usability: A, B, C, D Features: 1, 3, 4, 6, 7, 9, 10, 12

USABILITY
A. Software: For changing resolutions and colors.
B. Software: For driver installation.
C. Extra: Virtual desktop support.
D. Jumpers and Switches: None.

FEATURES
1. Drivers: Windows 3.1.
2. Memory: Expandable to 2MB.
3. Memory: Expandable to 4MB.
4. Memory: Expandable to 6MB.

5. Vertical Refresh: 72Hz or higher at all resolutions.
6. Number of Colors: 64,000.
7. Number of Colors: 16.7 million (true color).
8. Feature Connector: VESA advanced feature connector (VAFC) or VESA media channel (VMC) feature connector.
9. 3-D Support: OpenGL.
10. Resolution: 1,600 by 1,200 pixels at 16.7 million colors.
11. DRAM: 2MB minimum.
12. VRAM: 4MB minimum.

Direct to You

DESKTOP SYSTEMS — WHETHER A 486 OR PENTIUM, STOCK WITH RAM

USABILITY
A. **BIOS:** Flash BIOS for easy upgrade.
B. **Case:** Tool-free cover removal.
C. **CPU:** ZIF CPU socket.
D. **RAM:** Easy access to SIMMs.
E. **Hard Drive:** Enhanced IDE.

4. **Monitor:** 21-inch.
5. **Video:** 64-bit VL-bus or PCI accelerator with 2MB of RAM.
6. **Video:** 64-bit VL-bus or PCI accelerator with 4MB of RAM.
7. **Hard Drive:** Enhanced IDE or SCSI-2.
8. **Sound:** 16-bit sound card (Sound Blaster compatible).

FEATURES
1. **CPU:** 256K cache, upgradable to Pentium.
2. **RAM:** Expandable to 32MB.
3. **Monitor:** 17-inch.

9. **CD-ROM:** Dual-speed drive.
10. **Slots:** Three PCI or VL slots.
11. **Ports:** Two serial, one parallel, keyboard, mouse.

DECISION MAKER

1 What's more important?	2 Primary activity?	3 This is a minimum configuration:	4 Look for these features . .
Text & Numbers	Word Processing & E-mail	66MHz 486DX, 8MB of RAM, 340MB Hard Disk, 15-inch Monitor	Usability: A, B, C, D, E Features: 5, 7, 8, 9, 10, 11
	Spreadsheets & Databases	100MHz 486DX4 or Pentium, 16MB of RAM, 500MB Hard Disk	Usability: A, B, C, D, E Features: 1, 2, 4, 6, 7, 8, 9, 10, 11
Graphics, Design & Multimedia	Presentations, Drawing & Flowcharting	66MHz 486DX2, 16MB of RAM, 500MB Hard Disk, 17-inch Monitor	Usability: A, B, C, D, E Features: 1, 2, 3, 6, 7, 8, 10, 11
	CAD, 3-D Rendering & Image Editing	100MHz 486DX4 or Pentium, 16MB of RAM, 1GB Hard Disk, 21-inch Monitor	Usability: A, B, C, D, E Features: 1, 2, 4, 6, 7, 8, 10, 11

PORTABLE PCs — COLOR RULES AT LESS THAN SEVEN POUNDS

USABILITY
A. **Display:** 9.5-inch active-matrix or dual-scan passive-matrix color display.
B. **Display:** 7.5-inch or larger dual-scan passive- or active-matrix color display.
C. **Weight:** Total traveling weight less than 12 pounds.
D. **Weight:** Total traveling weight less than 7 pounds.
E. **Key Spacing:** Cursor controls and function keys at least half the size of QWERTY keys.
F. **Batteries:** Swappable without powering down.
G. **Battery Life:** At least 4 hours with power management set at half mast.

FEATURES
1. **RAM:** Expandable to at least 20MB.
2. **Slots:** Two Type II (or one Type III) PC Card.
3. **Slots:** At least one Type II PC Card.
4. **Ports:** Serial, parallel, VGA, keyboard, and PS/2 mouse.
5. **Sound:** Integrated sound chip.

DECISION MAKER

1 What's more important?	2 Primary activity?	3 This is a minimum configuration:	4 Look for these features . .
Desktop Use	Multimedia, Application Development, Graphics	75MHz DX4, 16MB of RAM, 500MB Hard Drive	Usability: A, C, E, F, G Features: 1, 2, 4, 5
	Word Processing and/or Spreadsheets	50MHz 486DX2, 8MB of RAM, 250MB Hard Drive	Usability: A, C, E, F, G Features: 1, 2, 4
Traveling Machine	Presentations, Communications	50MHz 486DX2, 8MB of RAM, 170MB Hard Drive	Usability: A, C, E, F, H Features: 1, 4, 5
	Word Processing, Spreadsheets, Databases	33MHz 486, 8MB of RAM, 120MB Hard Drive	Usability: B, D, E, F, H Features: 3, 4

DECISION MAKER

1 Where will you use it?	2 For what purpose?	3 This is a minimum configuration:	4 Look for these features …
Multimedia	5 or More Commercial Titles	Quad-speed Drive with 150Kbps to 600Kbps Transfer Rate	Usability: A, B, C Features: 1, 2, 4, 5, 6, 7, 8
	Proprietary, or Fewer than 5 Commercial Titles	Dual-speed Drive with 150Kbps to 300Kbps Transfer Rate	Usability: A, B, C Features: 1, 2, 4, 5, 6, 7, 8
Text & Static Images	1 or More Commercial Titles	Dual-speed Drive with 150Kbps to 300Kbps Transfer Rate	Usability: A, B, C Features: 1, 2, 4, 5, 6, 7, 8
	Proprietary, or Fewer than 5 Commercial Titles	Dual-speed Drive with 150Kbps to 300Kbps Transfer Rate	Usability: A, B, C Features: 1, 2, 4, 5, 6, 7, 8

USABILITY
A. **Door Cover:** Double doors on drive to deter dust.
B. **Control:** Output jack and manual volume control.
C. **Installation:** IRQs set through software, not jumpers or dip switches.

FEATURES
1. **Performance:** 200ms access time or faster.
2. **Interface:** SCSI-2.
3. **Buffer:** 64K or larger.
4. **Buffer:** 256K or larger.
5. **Compatibility:** MPC 2.
6. **Compatibility:** High Sierra and ISO-9660.
7. **Compatibility:** CD-Audio and Kodak Photo CD.
8. **Applications:** Bundled CDs.

DECISION MAKER

1 How big is your network?	2 Primary activity?	3 This is a minimum configuration:	4 Look for these features …
20 or Fewer Clients	File Storage	66MHz 486DX2, 16MB of RAM, 1GB Hard Disk	Usability: A, B, C, D, E Features: 2, 5, 6, 7, 9, 10, 12
	Application Services	60MHz Pentium, 16MB of RAM, 1GB Hard Disk	Usability: A, B, C, D, E Features: 1, 3, 4, 5, 6, 7, 9, 10, 12
21 or More Clients	File Storage	60MHz Pentium, 32MB of RAM, 2GB Hard Disk	Usability: A, B, C, D, E Features: 1, 3, 4, 6, 6, 7, 9, 9, 11, 12
	Application Services	90MHz Pentium, 64MB of RAM, 4GB Hard Disk, RAID Level 5	Usability: A, B, C, D, E Features: 1, 3, 5, 6, 7, 8, 9, 11, 12

USABILITY
A. **BIOS:** Flash for easy upgrades.
B. **Enclosure:** Tool-free removal.
C. **CPU Socket:** ZIF.
D. **SIMMs:** Easily accessible.
E. **Drive Bays:** Easily accessible.

FEATURES
1. **CPU Cache:** Expandable to 1MB.
2. **Upgrade Potential:** Pentium upgradable.
3. **Interface:** Wide SCSI-2.
4. **RAID:** Level 3 or 5.
5. **RAM:** Expandable to 128MB.
6. **Bus Slots:** Eight EISA with two VL or PCI.
7. **Internal Bays:** Two full-height 5¼-inch, two 3½-inch.
8. **External Bays:** Two half-height 5¼-inch with front-panel access.
9. **Backup:** DAT.
10. **Network Card:** One 16-bit.
11. **Network Cards:** Two 16-bit.
12. **Protection:** UPS.

Direct to You

SPEC WATCH:
Don't Settle for Less than These Specs

LASER PRINTERS   LOOK FOR 4 TO 8 PAGES PER MINUTE AND **PCL 5**

USABILITY
- **A. Emulation Switching:** Automatic, all ports active.
- **B. Paper Tray:** 200-sheet or larger with envelope feed.
- **C. Cartridges:** One or more HP-compatible cartridge slots.
- **D. Footprint:** 260 square inches or less.
- **E. RAM:** User-upgradable memory and interface.
- **F. Power Management:** Automatic sleep mode or EPA Energy Star compliance.
- **G. Display:** LED panel or software utility for paper jams, errors, and status.

FEATURES
1. **Page Description:** PCL 5 emulation.
2. **CPU:** RISC.
3. **RAM:** 2MB.
4. **RAM:** 4MB or more.
5. **Fonts:** 35 or more resident (at least 10 TrueType).
6. **Fonts:** 45 or more resident (at least 10 TrueType).
7. **Interface:** Bidirectional parallel interface.

DECISION MAKER

1 What will you use it for?	2 How many pages a day?	3 This is a minimum configuration	4 Look for these features . .
Text & Simple Business Graphics	More than 20	8 ppm, PCL 5, 300 dpi or Higher	Usability: C, D, E, F, G — Features: 2, 3, 5, 7
	20 or Fewer	4 ppm to 6 ppm, PCL 5, 300 dpi or Higher	Usability: B, C, D, E, F, G — Features: 2, 3, 5, 7
Graphics-Laden Documents	More than 20	8 ppm, PostScript 600 dpi	Usability: A, B, C, D, E, F, G — Features: 1, 2, 3, 4, 5
	20 or Fewer	4 ppm to 6 ppm, PostScript, 600 dpi	Usability: A, B, C, D, E, F, G — Features: 1, 2, 4, 5, 7

MONITORS   SELECT THE **RIGHT SIZE** FOR YOUR APPLICATIONS

USABILITY
- **A. Controls:** Front panel or onscreen digital.
- **B. Power Management:** EPA Energy Star.
- **C. Base:** Adjustable tilt and swivel.
- **D. Input:** Multiple input sources.
- **E. Settings:** Saved for different resolutions.

FEATURES
1. **Emissions:** MPR II.
2. **Tube:** Flat-square or Trinitron.
3. **Controls:** Microprocessor based.
4. **Controls:** Color.
5. **Coating:** Antiglare.
6. **Vertical Refresh:** At least 72Hz.
7. **Vertical Refresh:** At least 76Hz.
8. **Vertical Refresh:** At least 84Hz.

DECISION MAKER

1 What's more important?	2 Primary activity?	3 This is a minimum configuration	4 Look for these features . .
Text & Numbers	Word Processing & E-mail	15-inch, 800-by-600-Pixel Resolution, 0.28mm Dot Pitch	Usability: A, B, C, E — Features: 1, 2, 3, 5, 6
	Spreadsheets & Databases	17-inch, 1,024-by-768-Pixel Resolution, 0.28mm Dot Pitch	Usability: A, B, C, D, E — Features: 1, 2, 3, 5, 6
Graphics, Design & Multimedia	Presentation or Drawing	21-inch, 1,280-by-1,024-Pixel Resolution, 0.31mm Dot Pitch	Usability: A, B, C, D, E — Features: 1, 2, 3, 4, 5, 7
	CAD or Page Layout	21-inch, 1,600-by-1,280-Pixel Resolution, 0.31mm Dot Pitch	Usability: A, B, C, D, E — Features: 1, 2, 3, 4, 5, 8

236   MARCH 1995

Elite Pentium™ Processor
The Power Is Building

The excitement is building... and so is MidWest Micro. In fact, we've been building for quite some time. Not just a line of Elite Computer Systems—but a reputation for quality and value. And now we'd like to invite you to watch. Welcome to one of our works in progress—Elite Pentium™ Processor Based Systems.

Zoned For 100 MHz

When our developers first considered a Pentium project, they started by gathering the proper materials. And of course the raw power of Intel's Pentium processor was the very first item on everyone's list. In fact, this Elite line was designed to include four different levels of Pentium power—giving you P5-60, P5-75, P5-90 and P5-100 Systems to choose from. And in case the CD-ROM drives, fax modems and other extras built into these Elite PCs aren't enough to rattle your rafters, we've got plenty of add-ons in our product line for endless Pentium possibilities.

UP TO 100 MHZ PENTIUM

ALL SYSTEMS NOW

PCI

Get out your measuring tape —here's something that might surprise you. Perfect for your home *or* workshop, the mini-tower case shown here is equipped with three 5.25" and five 3.5" drive bays—but it still maintains compact dimensions of 15" high by 6.5" wide. MidWest Micro believes in expanding your *options*...not the size of your computer.

Minutes ago, Eugene had no idea that his dining room ceiling couldn't support a 50 pound chandelier. He also had no idea how filthy his attic really was. Now he is painfully aware of both. He is also painfully aware that his wife is due home in less than one hour. Luckily, his SoundBook survived the mishap...

intel inside

NOW!
WITH
3 YEAR

Elite Home PCs

486DX2-50 $1499
#008701
- Intel i486™ DX2-50 Processor
- 4 Mb RAM, 128 Kb Cache
- 545 Mb IDE Hard Drive
- PCI Local Bus Graphics with 1 Mb
- PCI Fast IDE Interface
- Double Speed CD-ROM Drive
- Microsoft® Family Bundle —
  Encarta,® Works, Money, Scenes,
  Dangerous Creatures & Golf
- 16-Bit Stereo Sound Card
- Digital Quality Speakers
- 9624 Fax Modem with Voicemail
- 3.5" Disk Drive
- 15" SVGA .28 Digital Color Monitor
  with Hitachi CRT
- 8-Bay Mini-Tower Case
- 4 ISA, 2 PCI & 1 PCI/ISA Slots
- Super I/O using 16550 UART & ECP/EPP
- 101-Key Enhanced Keyboard
- Microsoft Mouse
- MS-DOS® 6.22 and WFW 3.11
- Microsoft Complete Baseball CD
- EPA Energy Star Compliant
- The Real 3 Year Warranty

486DX2-66 $1599
#008702
- Intel i486 DX2-66 Processor
- 4 Mb RAM, 256 Kb Cache
- 1 Gb IDE Hard Drive
- PCI Fast IDE Interface

P5-100 $3499
#008709
- Intel 100 MHz Pentium Processor
- 16 Mb RAM, 256 Kb Cache
- 1 Gb IDE Hard Drive
- PCI Fast IDE Interface
- ATI MACH 64 PCI Accelerator with 2 Mb
- Quad Speed CD-ROM Drive
- Microsoft Family Bundle —
  Encarta, Works, Money, Scenes,
  Dangerous Creatures & Golf
- 16-Bit Wavetable Sound Card
- Altec Lansing Stereo Speakers
  with Subwoofer
- 14.4 Fax Modem with Voicemail
- 3.5" Disk Drive
- 17" .28 Digital Color Monitor
- 8-Bay Mini-Tower Case
- 4 ISA, 2 PCI & 1 PCI/ISA Slots
- Super I/O using 16550 UART & ECP/EPP
- Signature 101-Key Enhanced Keyboard
- Microsoft Mouse
- MS-DOS 6.22 and WFW 3.11
- Microsoft Complete Baseball CD
- The Real 3 Year Warranty

486DX4-100 $1999
#008703
- Intel i486™ DX4 100 Processor
- 8 Mb RAM, 128 Kb Cache
- 545 Mb IDE Hard Drive
- PCI Local Bus Graphics with 1 Mb
- PCI Fast IDE Interface
- Double Speed CD-ROM Drive
- Microsoft Family Bundle —
  Encarta, Works, Money, Scenes,
  Dangerous Creatures & Golf
- 16-Bit Stereo Sound Card
- Altec Lansing Stereo Speakers
- 14.4 Fax Modem with Voicemail
- 3.5" Disk Drive
- 15" SVGA .28 Digital Color Monitor
  with Hitachi CRT
- 8-Bay Mini-Tower Case
- 4 ISA, 2 PCI & 1 PCI/ISA Slots
- Super I/O using 16550 UART & ECP/EPP
- Microsoft Mouse
- MS-DOS 6.22 and WFW 3.11
- Microsoft Complete Baseball CD
- EPA Energy Star Compliant
- The Real 3 Year Warranty

486DX4-75 $1899
#008704

P5-75 $2299
#008705
- Intel® 75 MHz Pentium™ Processor
- 8 Mb RAM, 256 Kb Cache
- 850 Mb IDE Hard Drive
- PCI Fast IDE Interface
- PCI Local Bus Graphics with 1 Mb
- Double Speed CD-ROM Drive
- Microsoft Family Bundle —
  Encarta, Works, Money, Scenes,
  Dangerous Creatures & Golf
- 16-Bit Stereo Sound Card
- Altec Lansing Stereo Speakers
- 14.4 Fax Modem with Voicemail
- 3.5" Disk Drive
- 15" SVGA .28 Digital Color Monitor
  with Hitachi CRT
- 8-Bay Mini-Tower Case
- 4 ISA, 2 PCI & 1 PCI/ISA Slots
- Super I/O using 16550 UART & ECP/EPP
- Signature 101-Key Enhanced Keyboard
- Microsoft Mouse
- MS-DOS 6.22 and WFW 3.11
- Microsoft Complete Baseball CD
- The Real 3 Year Warranty

P5-60 $2199
#008706

P5-90 $2599
#008707
- Intel 90 MHz Pentium Processor
- 8 Mb RAM, 256 Kb Cache
- 850 Mb IDE Hard Drive
- PCI Fast IDE Interface
- ATI MACH 64 PCI Accelerator with 2 Mb
- Double Speed CD-ROM Drive
- Microsoft Family Bundle —
  Encarta, Works, Money, Scenes,
  Dangerous Creatures & Golf
- 16-Bit Wavetable Sound Card
- Altec Lansing Stereo Speakers
- 14.4 Fax Modem with Voicemail
- 3.5" Disk Drive
- 15" SVGA .28 Digital Color Monitor
  with Hitachi CRT
- 8-Bay Mini-Tower Case
- 4 ISA, 2 PCI & 1 PCI/ISA Slots
- Super I/O using 16550 UART & ECP/EPP
- Signature 101-Key Enhanced Keyboard
- Microsoft Mouse
- MS-DOS 6.22 and WFW 3.11
- Microsoft Complete Baseball CD
- The Real 3 Year Warranty

P5-100 $2999
#008708
- With 1 Gb Hard Drive

P5-90 $3199
#008710

intel inside

PC MAGAZINE EDITOR'S CHOICE
Dec 3, 1994
ATI Graphics XPression

ATI — Perfecting the PC

Elite Office PCs

DX2-50 PCI $1199
#008711
- IntelDX2 DX2-50 Processor
- 4 Mb RAM, 128 Kb Cache
- 545 Mb IDE Hard Drive
- PCI Fast IDE Interface
- PCI Local Bus Graphics with 1 Mb
- 9624 Fax Modem with Voicemail
- 3.5" Disk Drive
- 14" SVGA .28 N/I Color Monitor
- 8-Bay Mini-Tower Case
- 3 ISA, 2 PCI & 1 PCI/ISA Slots
- Super I/O using 16550 UART & ECP/EPP
- 101-Key Enhanced Keyboard
- High-Resolution Mouse
- MS-DOS 6.22 and WFW 3.11
- MS® Works for Windows™ 3.0
- EPA Energy Star Compliant
- The Real 3 Year Warranty

DX2-66 PCI $1299
#008712

DX2-50 PCI $1499
#008713
- IntelDX2 50 Processor
- 4 Mb RAM, 128 Kb Cache
- 545 Mb IDE Hard Drive
- PCI Fast IDE Interface
- PCI Local Bus Graphics with 1 Mb
- Double Speed CD-ROM Drive
- 9624 Fax Modem with Voicemail
- 3.5" Disk Drive
- 15" SVGA .28 Digital Color Monitor
  with Hitachi CRT
- 8-Bay Mini-Tower Case
- 3 ISA, 2 PCI & 1 PCI/ISA Slots
- Super I/O using 16550 UART & ECP/EPP
- 101-Key Enhanced Keyboard
- High-Resolution Mouse
- MS-DOS 6.22 and WFW 3.11
- MS Word 6.0, Bookshelf® '94, Encarta,
  Works Multimedia Edition 3.0 & Money 3.0
- EPA Energy Star Compliant
- The Real 3 Year Warranty

DX2-66 PCI $1599
#008714

DX4-75 PCI $1799
#008715
- IntelDX4 75 Processor
- 8 Mb RAM, 128 Kb Cache
- 545 Mb IDE Hard Drive
- PCI Fast IDE Interface
- PCI Local Bus Graphics with 1 Mb
- Double Speed CD-ROM Drive
- 14.4 Fax Modem with Voicemail
- 3.5" Disk Drive
- 15" SVGA .28 Digital Color Monitor
  with Hitachi CRT
- 8-Bay Mini-Tower Case
- 3 ISA, 2 PCI & 1 PCI/ISA Slots
- Super I/O using 16550 UART & ECP/EPP
- Signature 101-Key Enhanced Keyboard
- Microsoft Mouse
- MS-DOS 6.22 and WFW 3.11
- MS Word 6.0, Bookshelf '94, Encarta,
  Works Multimedia Edition 3.0 & Money 3.0
- EPA Energy Star Compliant
- The Real 3 Year Warranty

DX2-66 PCI $1749
#008716

DX4-100 PCI $1899
#008717

energy POLLUTION PREVENTED

Microsoft OFFICE

TestDrive SUPER STORE

All Systems with a CD-ROM
include TestDrive CD Software and
Microsoft Home CD Sampler

Elite SoundBook Plus Based On Intel's Pentium™ Processor

► PCI Local Bus Video with 1 Mb Video DRAM
► PCI Local Bus HDD Controller
► 16 Bit Stereo Audio (Sound Blaster & Windows™ Sound System Compatible)
► Built-in Stereo Speakers & Microphone
► External Jacks for Line In & Line Out
► 3.5" Built-in Disk Drive
► User Replaceable Hard Drive
► Two Type II/One Type III PCMCIA Slot
► Built-in Pointing Device
► NiMH Battery & AC Adapter
► Advanced Power Management
► Bi-directional EPP/ECP Parallel Port
► High Speed 16550 UART Serial Port
► Infra Red Wireless "IR" Interface
► External VGA & Keyboard/Mouse Port
► MS-DOS® 6.22 & WFW 3.11
► Microsoft® Works for Windows 3.0 & Golf
► Lotus® Organizer
► Weight: 6.8 lbs.
► Carrying Case
► The Real 3 Year Warranty

► Intel® Pentium® 90 or 75 MHz Processor
► 64-Bit, 256K Synchronous Burst External Cache
► 64-Bit, 8 Mb RAM (expands to 40 Mb)
► 10.3" Dual-Scan or 10.4" Active-Matrix VGA Display

Dual-Scan Color SoundBook Plus
P5-75 with 340 Mb HDD
#008090 **$2999**
P5-90 with 340 Mb HDD
#008029 **$3599**
P5-90 with 520 Mb HDD
#008025 **$3799**
P5-90 with 720 Mb HDD
#008026 **$3999**

Active-Matrix Color SoundBook Plus
P5-75 with 340 Mb HDD
#008091 **$4499**
P5-90 with 520 Mb HDD & 16 Mb of RAM
#008027 **$5499**
P5-90 with 720 Mb HDD & 24 Mb of RAM
#008028 **$5999**

(intel inside) pentium

NOW! WITH 3 YEAR

Elite SoundBook

► Intel486™, IntelDX2™ or IntelDX4™
► 4 Mb RAM (expands to 20 Mb)
► 9.5" Mono, 10.3" Dual-Scan or 9.5" Active-Matrix VGA Display
► Local Bus Video with 1 Mb Video DRAM
► Business Audio Features Including: Built-in Microphone & Speaker External Jacks for Line In & Line Out
► 3.5" Built-in Disk Drive
► User Replaceable Hard Drive
► Two Type II/One Type III PCMCIA Slot
► Built-in Trackball
► NiMH Battery & AC Adapter
► Advanced Power Management
► One Parallel & One Serial Port
► External VGA & Keyboard Port
► MS-DOS® 6.22 & WFW 3.11
► Microsoft® Works for Windows 3.0 & Golf
► Lotus Organizer
► Weight: Mono–6.2 lbs. Color–6.7 lbs.
► Carrying Case
► The Real 3 Year Warranty

Dual-Scan Color SoundBook
486SX-33 with 260 Mb HDD
#008065 **$1999**
DX2-50 with 340 Mb HDD
#008066 **$2099**
DX2-66 with 520 Mb HDD & 8 Mb of RAM
#008067 **$2499**
DX4-75 with 520 Mb HDD & 8 Mb of RAM
#008068 **$2699**
DX4-100 with 520 Mb HDD & 12 Mb of RAM
#008070 **$2999**
DX4-100 with 700 Mb HDD, 12 Mb of RAM & PCMCIA 14.4 S/R Fax Modem
#008069 **$3199**
DX4-100 with 700 Mb HDD, 20 Mb of RAM & PCMCIA 14.4 S/R Fax Modem
#008071 **$3699**

Active-Matrix Color SoundBook
DX2-66 with 340 Mb HDD
#008077 **$2999**
DX4-75 with 520 Mb HDD & 8 Mb of RAM
#008078 **$3499**
DX4-100 with 520 Mb HDD & 12 Mb of RAM
#008079 **$3799**
DX4-100 with 700 Mb HDD, 12 Mb of RAM & PCMCIA 14.4 S/R Fax Modem
#008080 **$3999**
DX4-100 with 700 Mb HDD, 20 Mb of RAM & PCMCIA 14.4 S/R Fax Modem
#008081 **$4499**

Monochrome SoundBook
486SX-33 with 260 Mb HDD
#008072 **$1399**
DX2-50 with 340 Mb HDD
#008073 **$1499**
DX2-66 with 520 Mb HDD
#008074 **$1699**
DX4-75 with 520 Mb HDD & 8 Mb of RAM
#008075 **$1999**
DX4-100 with 700 Mb HDD & 8 Mb of RAM
#008076 **$2199**

(intel inside)

Options

4 Mb RAM Card ....#005976	$239
8 Mb RAM Card ....#005977	$469
16 Mb RAM Card ....#005978	CALL
Car Adapter ....#005979	$59
Mobile Max PCMCIA 130 Mb HDD ...#004805	$289
Mobile Max PCMCIA 170 Mb HDD ...#004806	$345
PCMCIA 9624 Fax Modem ....#00172	$135
PCMCIA 14.4 Fax Modem ....#001812	$179
PCMCIA Combo Ethernet Adapter ....#01954	$139

*Ask your MidWest Micro sales representative about additional hard drive, screen and processor options.

Policy: No service charge for credit card orders. Prices are subject to change. Repair or replacement of defective products is at MidWest Micro's discretion. We are not responsible for errors in typography and photography. Original shipping and handling fees, as well as return shipping charges, are non-refundable. There are no returns for credit after 30 days. All returns must be shipped in original packaging. Call or write MidWest Micro for more information on warranties and policies.

MIDWEST MICRO
IT'S IN OUR NATURE

6910 U.S. Route 36 East, Fletcher, Ohio 45326

1-800-682-7248
Fax: 1-800-562-6622
Monday–Friday 9 am to 9 pm · Saturday 10 am to 4 pm

MasterCard VISA DISCOVER

For your protection we check thoroughly for stolen credit cards.
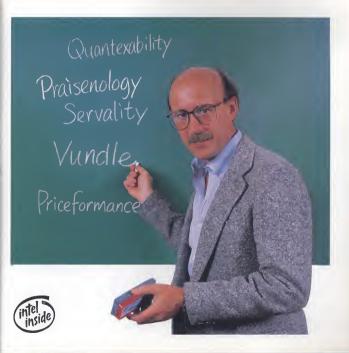
Technical Support:
1-800-262-6622
Customer Service:
1-800-728-8584
Dealers Call:
1-800-682-4711

AD#M03

Circle 237 on reader service card.

Can You Speak Quantex?

We tried and we tried. But words escaped us. The right words just didn't seem to exist to fully express all the benefits you receive by dealing with Quantex. So, we kind of made up our own language. Now we can better convey the combination of service, technology, dedication, performance and price Quantex brings to the party. After you take this little language lesson you'll realize that when it comes to value, Quantex really does speak your language.

Quantexability

Praisenology

Servality

Vundle.

Priceformance

intel inside

"Quantexability"

"The ability to build systems you need at prices that won't break your budget."

Quantex has the critics cheering, technology that's topping the charts, plus the best software bundles you'll find, all at a value that won't sink your savings. "Quantexability" means powerful systems that are built strong, fast, and built to last. Packed with state-of-the-art technology, the finest components, and a valuable bundle of the highest quality software, you'll find that when you compare Quantex feature for feature and dollar for dollar to any other PC, there simply is no comparison. No tricks. No gimmicks. Just great value that lasts. So go ahead and give one of our friendly sales representatives a call today. You'll find that it's easy to see why more and more people are making Quantex their choice.

System picture with tower case and 17" monitor

"Praisenology"

"Industry praise and awards plus the latest technology."

Quantex is coming on strong with systems boasting the technology to outperform the competition, time and time again. Tried, tested and true, Quantex PC's keep rising to the challenge to take home the trophy. In January '95, a power-packed QP5/90 multimedia machine plucked the coveted **PC World** "Best Buy Award" for Power Desktops for the fourth month running. And **Computer Shopper** (8/94) was right on the Benchmark when they said our QP5/90 powerhouse is "unquestionably a front-runner" after it blew away the top competition's Winstone test scores. Furthermore, **PC Computing** asserts that we're an "Excellent bet for high-end systems," topping off their fine review with a ★★★★ ranking in their Top 60 Direct Vendors review (7/94.) The bottom line? When you buy Quantex, you get "a lot of PC for your money...a great deal, pure and simple."

"Servality"

"Great service coupled with top quality"

Quantex builds systems right. With the fastest processors, biggest hard drives, and premier software. And we seal the deal with a service package that's sure to inspire confidence. Not only do you get One-Year Free Parts and Labor, One-Year Free On-Site Service, our 30-day money-back guarantee, plus a lifetime of toll-free technical support—you can now take advantage of our extended warranty option, the GE Service Protection Plus plan. With the option of having your Quantex system covered for up to four years, you get nothing but peace of mind. Call one of our friendly sales professionals today to get the details on our new way of keeping your system protected for years to come.

"Priceformance"

"The perfect combination of great price and excellent performance."

Looking for peak performance at a price that won't break the bank? You've come to the right place. Whether it's a feature-packed multimedia machine or a peak-performance workstation, you'll get systems chock-full of the most advanced components on the market. With Pentium processors running at up to an aggressive 100MHz, you're going to get plenty of power for today and tomorrow. Our hard drives have been beefed-up, and with colossal 850MB and 1Gig of storage you get practically unlimited room to roam. Dual PCI and the awesome performance of a 64-bit Graphics Engine give you faster, more colorful display—you'll see the depth of the difference on our extra-large 17" monitors. So why break the bank? Quantex works hard to make your choice easy.

"Vundle"

"Real value in CD bundles"

When PC World so eloquently praised us for our "Gobs of software," they were right on the money. Speaking of money, you'll save a bundle with Quantex's innovative, easy-to-use, and valuable software bundles. Like the **WordPerfect PerfectOffice™ suite**, packed with award-winning software like **WordPerfect 6.1**, **Presentations 3.0**, **Quattro® Pro 6.0**, and much more! **WordPerfect MainStreet Select** bursts with products that educate, entertain, and increase productivity. There's also **Compton's Interactive Encyclopedia**, **Travel Everywhere USA**, the **Mayo Clinic Family Health Book**, **Dragon Lore**, **Quicken** and more!

intel inside

QUANTEX
Microsystems, Inc.

...ktop is Over.

NP9500

- Intel Upgradeable 486 CPU
- 1MB Video RAM
- 32-bit VESA Local Bus Video with Windows Accelerator
- 32-bit Local Bus IDE
- 256KB Secondary Cache Memory Expandable to 512KB or 1MB
- 16-Bit Stereo Sound with 2 Stereo Speakers and 1 Microphone
- 4MB RAM, Expandable to 64MB
- Removable 340MB Hard Drive (250, 520, 810MB Optional)
- Removable 3.5" 1.44MB Floppy Drive
- 9.5" Mono, 10.3" Dual Scan, 9.5" or 10.4" Active Matrix VGA Display
- CRT 1024x768, 256 Colors
- Simultaneous CRT & LCD Operation
- Integrated Pointing Device
- Advanced Power Management with SMM
- 2 PCMCIA Type I & II or 1 Type III Slots
- Super Long Life NiMH Battery
- 2 16C550 Compatible Serial Ports
- 1 Parallel Port with ECP/EPP Support
- Other Ports: Game, Ext. Keyboard, Ext. VGA Monitor, Ext. FDD & 200 Pin Connector for Docking Station
- Jacks - 1 line in, 1 line out & 1 Microphone
- 85-Key Keyboard
- Microsoft DOS 6.22
- Carrying Bag & AC/Adapter
- Weight 7.8Lbs. with Battery
- 11.69"W x 9.06"D x 2.44"H
- Sager's Umbrella Protection Policy

NP9500 OPTIONS

5.25" Double Speed CD-ROM Module
3.5" HDD Module
TV Tuner Module
2nd & 3rd Battery Module
Docking Station
Car Adapter
Numeric Keypad
PCMCIA Cards (FAX/Modem, Ethernet, SCSI & More)

OTHER NP9500 HIGHLIGHTS

- **Advanced Local Bus Video System**
  1MB Video RAM, 32-Bit VESA Local Bus Video w/Windows Accelerator, & Multimedia Interface for Live Video
- **32-Bit Local Bus IDE**
  Improves Data Transfer Rate Up To 45%
- **Advanced Audio True-Sound System**
  Built-in 16-Bit Audio, 1 Microphone, 2 Stereo Speakers & Audio Amplifier
- **Extra Built-in Ports**
  The only notebook to give you 2 serial ports & 1 game port for joystick or MIDI interface
- **Super-Long Operating Time - Up to 6.5 Watts of Power**
  Comes standard with one 35 Watt NiMH battery pack, which will give 2.5 hours of operating time. PLUS notebook can handle 2nd & 3rd battery pack modules which will give an additional 35Watts or 17Watts (87Watts total) - which results in up to 6.5+ hours run time.
- **Interchangeable Modules**
  Choose from many interchangeable modules that can be used in both the notebook and/or docking station - including 5 1/4" 2x CDROM, TV-Tuner, 3 1/2" FDD, 3 1/2" HDD and extra battery modules

SAGER SYSTEMS	9.5" MONO	10.3" COLOR DUAL SCAN	9.5" COLOR ACTIVE MATRIX	10.4" COLOR ACTIVE MATRIX
NP7500/486SX-33	$1495	$1925	$2595	
NP7500/486DX2-66	$1575	$1995	$2675	
NP7500/486DX4-100	$1725	$2145	$2825	
NP7500/PENTIUM-75		$2595	$3395	$3695
NP7500/PENTIUM-100		$2845	$3645	$3945
NP9500/486SX-33	$1645	$2095	$2745	$2995
NP9500/486DX2-66	$1725	$2175	$2825	$3075
NP9500/486DX4-75	$1825	$2275	$2925	$3175
NP9500/486DX4-100	$1875	$2325	$2975	$3225

Any computer information service that has a place for everything from dinosaurs to technophiles certainly has a place for you.

At CompuServe, we know that one of the most important things you're looking for in a computer information service is not more of the same, but more of the different. So we offer the benefits of

life more interesting, easier, and a lot more fun.

And for one low monthly fee, CompuServe offers unlimited connect time — day or night — to a full package with more than 100 popular services.

, movie and
es a month are
many other

information
uter dealer, or
international
special places

erve

n't outgrow.

Any computer information service that
has a place for everything from dinosaurs to technophiles
certainly has a place for you.

At CompuServe, we know that one of the
most important things you're looking for in
a computer information service is not more of the same,
but more of the different. So we offer the benefits of
nearly 2,000 different places to go, and over two and a
half million members worldwide.

In our special-interest forums, you can
talk to people involved in everything from
prehistoric dinosaurs to modern technology. Or get
hardware and software support including downloadable
freeware and shareware, technical support reps, and
other users of your equipment to chat with. For reference,
we have the *Academic American Encyclopedia*, business and
magazine databases, and more. We also offer games,
the Electronic Mall®, and other special features to make
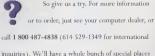
life more interesting, easier, and a lot more fun.
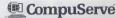
And for one low monthly fee, CompuServe
offers unlimited connect time — day or night —
to a full package with more than 100 popular services.
News, stock quotes, travel arrangements, movie and
restaurant reviews, and 60 e-mail messages a month are
just some of what's available. Along with many other
services for a nominal additional charge.

So give us a try. For more information
or to order, just see your computer dealer, or
call **1 800 487-4838** (614 529-1349 for international
inquiries). We'll have a whole bunch of special places
waiting. Just for you.

Genuine Samsung display features brilliant 9.4" color DSTN or color TFT LCD full-size 80 column 25line 640x480 resolution with 1MB video RAM and local bus video/GUI accelerator.

Simultaneous LCD and CRT display capability.

You're covered with a free 1 year membership in Samsung Executive Support Program, a 30-day money-back guarantee, a two year limited warranty and lifetime toll-free technical support.

A 3.5", 1.44MB floppy drive and a removable hard drive in your choice of storage capabilities: 340, 520, or 732MB.

NoteMaster™ S3945T — Easy on your wallet.

Model			
S3945T, DX2/50, DSTN, 170MB HDD, 4MB RAM	**$1,999**
S3945T, DX2/50, DSTN, 340MB HDD, 4MB RAM	**$2,299**
S3945T, DX4/75, DSTN, 520MB HDD, 4MB RAM	**$2,799**
S3945T, DX2/50, TFT, 340MB HDD, 4MB RAM	**$2,899**
S3945T, DX2/50, TFT, 520MB HDD, 8MB RAM	**$3,648**
S3945T, DX4/75, TFT, 732MB HDD, 8MB RAM	**$3,848**

NiMH batteries operate up to 3 hours with a quick re-charging time of 2 hours. A free voltage adapter: 100V-250V included.

Port interface: parallel, serial, external monitor, external keyboard/keypad and CableMaster (120 pins).

The most comfortable keyboard layout available! A built-in wrist rest and trackball intuitively placed for the ultimate ease of use.

No more fumbling with PCMCIA cards. Two PCMCIA slots—one type-I or type-II and one type-III can be used simultaneously. A unique feature not found in other notebooks!

Driven by blazingly fast Intel® 80486DX2/50 and DX4/75 microprocessors, this notebook is CPU upgradable.

A sleek 6.5 pounds (TFT color), 11.3"x8.9"x2.1".

A mere 3.9 pounds (TFT Color), 10.2"x7.8"x1.69". A free carrying case is included.

Duracell NiMH batteries operate 2-3 hours with a quick charging time of 1.5 hours. A free AC voltage adapter: 100V-250V included.

Work-hungry Intel® 80486DX2/50 or DX4/75 microprocessors.

NEW!

SENSLite™ 200 — Easy on your wallet.

Model			
S200, DX2/50, DSTN, 260MB HDD, 4MB RAM, EXT FDD	**$1,999**
S200, DX4/75, DSTN, 520MB HDD, 4MB RAM, EXT FDD	**$2,599**
S200, DX2/50, TFT, 340MB HDD, 4MB RAM, EXT FDD	**$2,799**
S200, DX4/75, TFT, 520MB HDD, 8MB RAM, EXT FDD	**$3,499**

A removable 12.7mm high, 2.5" wide hard drive, in your choice of storage capacities: 260, 340 or 520MB.

Built-in business audio features internal microphone, speaker and is compatible with Microsoft Windows™ sound system.

The AT-compatible keyboard features an easy-to-use-in-tight-spaces integrated pointing device.

Brilliant 8.3" color DSTN or 7.8" color TFT LCD full-size 80 column 25 line 640x480 resolution display with 512KB video RAM and local bus video/GUI accelerator.

Port interface: parallel, serial, CableMaster (120 pins) and external speaker jack.

Two type-II PCMCIA slots that can be used simultaneously.

The NoteMaster and SENSLite both come with:

Standard 8KB cache and 4MB memory, expandable to 20MB via 4, 8, or 16MB memory card.

Samsung's exclusive Executive Support Program, a 30-day money-back guarantee, a two year manufacturer's warranty and lifetime toll-free technical support.

Advanced Power Management System (PMS) with hibernation, battery charge control, smart sleep, low battery alarm & suspend/resume functions.

MS-DOS, Windows, BIOS shadowing, Quick booting and anti-virus software, pre-loaded so you can get to work right away.

Upgrade to 8MB for only $179!

intel inside

We use only genuine Intel microprocessors in our quality computer systems

energy

SAMSUNG
ELECTRONICS

800-316-3866

FAX 602-902-1008

Design, prices and specifications are subject to change without notice. Photos may not represent actual product. 10% restocking fee on items returned for credit. All brand and product names are trademarks or registered trademarks of their respective companies. The Intel and Intel Inside logos are registered trademarks of Intel Corporation. Intel 80486DX2/50, DX4/75 and DX4/100 are trademarks of Intel Corporation. This device complies with FCC class B, UL and CSA. 30-day guarantee, 2 year limited warranty, and Samsung's Executive Support Program (ESP) may have restrictions. 800-377-3000 602-902-1000 © IEI, 1994

Circle 279 on reader service card.

NRI makes it easy to start a new career as a computer service technician

Training so well-rounded, even beginners feel at ease

Training with NRI is stress-free because you're never overwhelmed. You get a solid foundation in electronics and computers through bite-sized lessons that cover every base, from upgrading to peripheral repair, from virus protection to fixing RAM problems. Constantly updated, these lessons will serve as valuable references throughout your new career.

Another resource available to you is NRI's team of instructors and technical professionals. By reviewing your projects, they make sure that you can apply theory to real-world demands. What's more, they're available to answer your questions throughout your training and career.

Learn by doing, the NRI way

Only NRI can ensure your success because only NRI gives you hands-on experience with the kind of computer, peripherals, software, and diagnostic equipment you'll be using and servicing in the real world.

Windows 95!

As you explore circuitry, perform tests and demonstrations, and learn to use the Ultra-X tools, multimedia peripherals, and Windows 95 included in your course, you quickly gain a competitive edge over all those who learned "by the book" only. This edge will enable you to begin earning good money as a computer service professional *even before you complete your training program!*

Find out how NRI can help you create the kind of successful future you deserve by sending for your free catalog. And remember, NRI has many interactive training options available to you. Check the box next to the field that interests you most!

You work with the biggest name in operating and applications software: WINDOWS 95, the user-friendly program everyone's talking about!

NRI's exclusive DISCOVERY LAB, along with a digital multimeter, acquaints you with the electronics principles behind today's computer technology.

You train with and keep top-of-the-line professional DIAGNOSTIC EQUIPMENT from Ultra-X — the R.A.C.E.R. plug-in card and QuickTech-PRO diagnostic software. These ingenious tools help you quickly locate and correct defects in IBM-compatible machines, even if they're only 5% operational!

SEND CARD TODAY FOR FREE NRI CATALOG

If the card is missing, write to:

NRI Schools

McGraw-Hill Continuing Education Center
4401 Connecticut Avenue, NW
Washington, DC 20008

IBM is a registered trademark of International Business Machines Corp. R.A.C.E.R. and QuickTech are registered trademarks of Ultra-X, Inc. Intel Inside is a trademark of the Intel Corp.

CARD 102

Start Exploring Your Own
ImagiNation With 5 FREE HOURS!

Here's What You Get...

1. Mail in this card and in less than a week you will receive your software.

2. A brand new membership with 5 free hours of network time to use within the first 30 days to get acquainted with new friends. After you use your free hours, our regular rates will apply.

TRY IT FREE!

3. A free subscription to *Imaginings*, the members-only full color newsletter that highlights coming attractions and features profiles of members and on-line celebrities.

The ImagiNation map...what you'll see when you sign on.

Here's All You Need...

1. I have at least a 386sx or better with a hard drive and 4MB RAM. I also have VGA graphics and a Microsoft-compatible mouse.

2. You bet I have at least a 2400 baud modem. You think I want to have all this fun by myself?

3. ImagiNation. Of course I have that. Are you crazy?

And if you need help installing The ImagiNation Network software or using it, just give us a call.

1-800-IMAGIN-1
(1-800-462-4461)

We pay the postage!

IMAGINATION!
Get Your Family on
ImagiNation Today...

Start Exploring Your Own ImagiNation With **5 FREE HOURS!**

Here's What You Get...

1. Mail in this card and in less than a week you will receive your software.

2. A brand new membership with 5 free hours of network time to use within the first 30 days to get acquainted with new friends. After you use your free hours, our regular rates will apply.

TRY IT FREE!

3. A free subscription to

Here's All You Need...

1. I have at least a 386sx or better with a hard drive and 4MB RAM. I also have VGA graphics and a Microsoft-compatible mouse.

2. You bet I have at least a 2400 baud modem. You think I want to have all this fun by myself?

3. ImagiNation. Of course I have that. Are you crazy?

And if you need help installing The ImagiNation Network

Advertiser Index

For free information on these advertisements, circle the corresponding reader service number on the reply card on page 291-292.

FYI

PC Computing

Marketplace

BOARDS/COMPONENTS/CHIPS-HARDWARE ON-LINE SERVICES

BUSINESS APPLICATIONS–EDUCATION

PCComputing **FREE PRODUCT INFORMATION**

Circle the numbers below corresponding to products featured in this issue's advertisements and listed
in the Editorial Product Index. Manufacturers will mail product literature to you free of charge.

Void after June 30, 1995

PRODUCTS FEATURED IN **ADVERTISEMENTS**	PRODUCTS FEATURED IN **EDITORIAL**

101 102 103 104 105 106 107 108 109 110 111 112 113 114 115 116 117 118 119 120 121 122 123 124 125
126 127 128 129 130 131 132 133 134 135 136 137 138 139 140 141 142 143 144 145 146 147 148 149 150
151 152 153 154 155 156 157 158 159 160 161 162 163 164 165 166 167 168 169 170 171 172 173 174 175
176 177 178 179 180 181 182 183 184 185 186 187 188 189 190 191 192 193 194 195 196 197 198 199 200
201 202 203 204 205 206 207 208 209 210 211 212 213 214 215 216 217 218 219 220 221 222 223 224 225
226 227 228 229 230 231 232 233 234 235 236 237 238 239 240 241 242 243 244 245 246 247 248 249 250
251 252 253 254 255 256 257 258 259 260 261 262 263 264 265 266 267 268 269 270 271 272 273 274 275
276 277 278 279 280 281 282 283 284 285 286 287 288 289 290 291 292 293 294 295 296 297 298 299 300
301 302 303 304 305 306 307 308 309 310 311 312 313 314 315 316 317 318 319 320 321 322 323 324 325
326 327 328 329 330 331 332 333 334 335 336 337 338 339 340 341 342 343 344 345 346 347 348 349 350
351 352 353 354 355 356 357 358 359 360 361 362 363 364 365 366 367 368 369 370 371 372 373 374 375
376 377 378 379 380 381 382 383 384 385 386 387 388 389 390 391 392 393 394 395 396 397 398 399 400
401 402 403 404 405 406 407 408 409 410 411 412 413 414 415 416 417 418 419 420 421 422 423 424 425
426 427 428 429 430 431 432 433 434 435 436 437 438 439 440 441 442 443 444 445 446 447 448 449 450
451 452 453 454 455 456 457 458 459 460 461 462 463 464 465 466 467 468 469 470 471 472 473 474 475
476 477 478 479 480 481 482 483 484 485 486 487 488 489 490 491 492 493 494 495 496 497 498 499 500
501 502 503 504 505 506 507 508 509 510 511 512 513 514 515 516 517 518 519 520 521 522 523 524 525
526 527 528 529 530 531 532 533 534 535 536 537 538 539 540 541 542 543 544 545 546 547 548 549 550
551 552 553 554 555 556 557 558 559 560 561 562 563 564 565 566 567 568 569 570 571 572 573 574 575
576 577 578 579 580 581 582 583 584 585 586 587 588 589 590 591 592 593 594 595 596 597 598 599 600

601 602 603 604 605 606 607 608 609 610 611 612 613 614 615
616 617 618 619 620 621 622 623 624 625 626 627 628 629 630
631 632 633 634 635 636 637 638 639 640 641 642 643 644 645
646 647 648 649 650 651 652 653 654 655 656 657 658 659 660
661 662 663 664 665 666 667 668 669 670 671 672 673 674 675
676 677 678 679 680 681 682 683 684 685 686 687 688 689 690
691 692 693 694 695 696 697 698 699 700 701 702 703 704 705
706 707 708 709 710 711 712 713 714 715 716 717 718 719 720
721 722 723 724 725 726 727 728 729 730 731 732 733 734 735
736 737 738 739 740 741 742 743 744 745 746 747 748 749 750
751 752 753 754 755 756 757 758 759 760 761 762 763 764 765
766 767 768 769 770 771 772 773 774 775 776 777 778 779 780
781 782 783 784 785 786 787 788 789 790 791 792 793 794 795
796 797 798 799 800 801 802 803 804 805 806 807 808 809 810
811 812 813 814 815 816 817 818 819 820 821 822 823 824 825
826 827 828 829 830 831 832 833 834 835 836 837 838 839 840
841 842 843 844 845 846 847 848 849 850 851 852 853 854 855
856 857 858 859 860 861 862 863 864 865 866 867 868 869 870
871 872 873 874 875 876 877 878 879 880 881 882 883 884 885
886 887 888 889 890 891 892 893 894 895 896 897 898 899 900

Please answer questions below:

PCC 3/95-4

1. Where do you use your computer? (Check one only):
A. ☐ Home   B. ☐ Business   C. ☐ Both

2. What kind of computers do you use? (Check all that apply):
D. ☐ IBM/Compatible Laptop   E. ☐ IBM/Compatible Desktop   F. ☐ MAC

3. Do you plan to buy any of the hardware or software mentioned below in the next 12 months? (Check all that apply):

HARDWARE
G. ☐ PC
H. ☐ MAC
I. ☐ Laptop
J. ☐ Printer
K. ☐ Monitor
L. ☐ Disk/Tape Back-up
M. ☐ Add-in Board
N. ☐ Modem
O. ☐ Input Device
P. ☐ Local Area Network

SOFTWARE
Q. ☐ Accounting
R. ☐ Spreadsheet
S. ☐ Personal Finance
T. ☐ Desktop Publishing
U. ☐ Word Processor
V. ☐ Database Manager
W. ☐ Graphics
X. ☐ Utility

Y. ☐ Communications
Z. ☐ Windows/Multi-tasking
1. ☐ Programming Language/
   Compiler
2. ☐ Integrated/Multifunction
3. ☐ CAD
4. ☐ CD-ROM

4. From which of the following sources do you purchase personal computer products? (Check all that apply):
5. ☐ Specialty Computer Retail Stores   7. ☐ Direct from Manufacturers
6. ☐ Mail Order Firms   8. ☐ Other

PLEASE PRINT CLEARLY

Name

Title ___ Telephone

Company Name

Address

City ___ State ___ Zip

6. ☐ Please send me a one-year (12 issue) subscription to PC/Computing for $16.97 (U.S. price); all other countries add $16.00 for additional postage.

EDUCATION/FINANCIAL

GRAPHICS/DESIGN–MULTI-MEDIA

294   MARCH 1995

CLASSIFIED

CLASSIFIED

PC/Computing subscribers triple accessory spending.

In the next 6 months, PC/Computing subscribers intend to triple accessory spending for their organizations to an average of $9,641—up from $3,311.

Get your share!

Advertise in PC/Computing Marketplace.

Call today for information at 800 825-4237.

Source: 1st Half 1992 Buying Trends Market Study
Base: employed subscribers

CLASSIFIED

PC/Computing readers buy from Marketplace

93% of PC/Computing subscribers who know Marketplace have purchased hardware, software, and/or related supplies/services in the past 12 months, or would consider doing so, after seeing an ad in the section.

Any Product   93%
Software   91%
Hardware   88%
Supplies/Services   83%

Advertise here, where business buys computing solutions. Call your PC/Computing Marketplace representative today at 800 825-4237.

Source: 1993 PC/Computing Marketplace Subscriber Study,
Base: 66% of subscribers who have noticed Marketplace

AS YOU'D
WE'VE GOT ALL THE

BUYERS OF computer products are turning to Ziff-Davis magazines in record numbers. Afterall, we are the source of the most timely and concise information needed to make wise purchasing decisions.

16 FASTEST GROWING PUBLICATIONS

1. YM	9. Cooking Light
2. PC/Computing	10. The Family Handyman
3. Computer Shopper	11. Prevention
4. MacUser	12. Backpacker
5. Stock Car Racing	13. Truckin'
6. Vanity Fair	14. Spy
7. National Geographic	15. Consumers Digest
8. Crafts 'N Things	16. PC Magazine

Four Ziff-Davis titles are among the fastest-growing magazines in single copy sales.[1]

That includes *all* paid magazine categories, not just computer publications.

Nothing tests the quality of a magazine like single-copy sales. Each issue has to sell itself among

a host of competitors. And earn readership from buyers required to pay full cover price. That's why it's especially important for advertisers to know that Ziff-Davis paid magazines set a torrid pace of 24.1%[2] growth in single-copy sales over the past 12 months.

102% circulation growth in just four years.[3]

Our newsstand dominance is the result of record-setting performance. But it's only part of the story. Over the

Ziff-Davis magazines account for 64% of all major computer magazines sold at newsstands.[?]

ZIFF-DAVIS PAID PUBLICATIONS
64%

ALL OTHERS
36%

EXPECT,
HOTTEST NUMBERS.

last four years, Ziff-Davis total circulation has nearly doubled, today accounting for nearly 50% of all paid computer magazine circulation.

What makes for such overwhelming leadership?

Clearly buyers recognize that Ziff-Davis magazines deliver the most reliable product information. Our long record of distinguished editorial and lab-based testing pays off for computer product buyers. And the advertisers who reach them through our magazines.
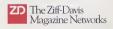
Bigger than the business books.

Leave it to the computer industry to change the landscape. Reliable information about products is so critical to business buyers that the circulation of Ziff-Davis paid magazines now exceeds the combined circulation of BusinessWeek, Forbes and Fortune.

Get with the record books.

Ziff-Davis magazines have set the standards for top editorial, scientific lab testing, record-setting newsstand performance and dynamic circulation growth. Advertising in Ziff-Davis magazines is simply the best way to reach more buyers at the most attractive rates. To set a few records of your own, get into the winners…the great magazines of Ziff-Davis.

ZD The Ziff-Davis
Magazine Networks

EXPLORE the INTERNET!

FREE*

Delphi Internet™ offers you full access to the Internet and now you can explore this incredible resource with no risk. You get 5 hours of evening and weekend access to try it out for free!*

Use Delphi Internet's mail gateway to exchange messages with over 30 million people at universities, companies, and other online services such as CompuServe® and MCI Mail®. Download programs and files using **FTP** or connect in real-time to other networks using **Telnet**. You can also meet people on the Internet. **Internet Relay Chat** lets you "talk" with people all over the world and **Usenet News** is the world's largest bulletin board with over 20,000 topics!

To help you find the information you want, you'll have access to powerful search utilities such as **Gopher**, **Hytelnet** and **WAIS**. If you aren't familiar with these terms, don't worry; Delphi Internet has hundreds of expert online assistants and a large collection of help files, books, programs, and other resources to help get you started.

Over 850 local access numbers are available across the country. Explore Delphi Internet today. You'll be amazed by what you discover.

now supporting **9,600** and **14,400** bps *at no extra charge*

FIVE HOUR FREE TRIAL!*

Dial By Modem 1-800-365-4636, Press return until you get a prompt At Username, enter JOINDELPHI. At Password, Enter PCC395

This offer applies to new members only. Five one-per-household and is valid for a limited time. A valid credit card is required for immediate access. Free time may be used only during the remainder of the calendar month of becoming a member. Telecom surcharges apply during business hours (local or 6pm weekdays) via Tymnet or Sprintnet and for access outside the United States. New members must agree to Terms and Conditions of membership when joining. Complete details and other restrictions are provided during the toll-free registration. DELPHI INTERNET is a trademark of Delphi Internet Services Corporation

Attention Current Internet Users: See what Delphi Internet can offer you! Stock quotes, Grolier's Encyclopedia, newswires, and hundreds of other services are just a few keystrokes away. Telnet to delphi.com and enter the username and password above for a free trial

**9,600 bps available in most local areas via Tymnet and Sprinnet. 14,400 bps available by dialing direct to Cambridge, MA.

DELPHI
INTERNET™

Questions? Call 1-800-695-4005
Send e-mail to INFO@delphi.com

© 1994 Delphi Internet Services Corporation

Circle 239 on reader service card.

I-Way Patrol

Keeping Current

Stop! Before you plug your PC Card modem into that unknown RJ-11, test it! If it's digital, your PC Card is fried. IBM's Modem Saver device tests for excessive current, saving you this hassle.

Modem Saver / IBM / (800) 388-7080 / $29 direct / *Reader Service No. 680*

Buy! Sell! Buy!

Get quotes on more than 40,000 stocks a mere 15 minutes after they're posted through QuoteCom's Internet service. For $9.95 a month, you can download up to 100 quotes per day.

QuoteCom / http://www.quote .com / (800) 261-7740 / $9.95 per month / *Reader Service No. 681*

Beltway Net Lobby

Hey, Newt! The Internet Business Association (IBA) represents Internet-related companies on Capitol Hill and works to enhance business use of the Net.

Internet Business Association / (800) 779-1323 / Membership from $25 to $8,000 / *Reader Service No. 682*

BBS WATCH

Cyberspace Right Now

Most of the hype surrounding the information superhighway focuses on two ways to wire your business to the world: the major commercial online services and direct Internet access. While there's no question that dialing for data is one of the best ways to give your business an information edge on the competition, there's another on-ramp to the I-Way that's often overlooked: the bulletin board system (BBS).

BBSs are pervasive, low-cost solutions for distributing products, software patches, upgrades, and other information to a wide, technically savvy audience. An estimated 60,000 BBS operators support 17 million users—four times the total number of users for all commercial online services. The result is $2 billion worth of business. And while it may take BBSs some time to outgrow their reputation as the less glamorous cousins of

the commercial online services, they're quickly coming up to speed with the introduction of new features such as true Windows interfaces and expanded Internet access and services. For most BBSs, this includes e-mail and Usenet newsgroups.

Leading the charge, Florida-based Galacticomm has been working on a true Windows BBS called Worldgroup, which is expected to be released sometime in early 1995. Worldgroup

surpasses Galacticomm's BBS mainstay, Major BBS (which competes with Clark Development's PCBoard and Mustang Software's Wildcat), by using familiar Windows features such as file menus, drag and drop, and directories to communicate and exchange information with a wide range of services online.

For more information on Worldgroup, contact Galacticomm at (305) 583-5990.

The Next Dimension: Galacticomm's Worldgroup adds a Windows interface to the universe of 60,000 BBSs.

ONE-MINUTE GUIDE **Listservs: More Than Just Junk E-Mail**

Why search for the latest news when you can have it come to you? There are more than 5,000 Listserv groups on the Net, covering topics from ammunition to Zen. The groups are similar to Usenet newsgroups, but they automatically send you mail—all you have to do is subscribe. Here's how:

FINDING A GROUP First, send e-mail to listserv@bitnic.educom.edu. In the body of the message (leave the subject blank),

type LIST GLOBAL. You'll automatically get a message listing nearly half of the available Listserv groups, with a short description of each.

SUBSCRIBING TO A GROUP If you find a topic that interests you, send e-mail to the Listserv site (not to the group itself) asking to subscribe to the list. In the body of the message (leave the subject blank), type SUBSCRIBE *group firstname lastname* (where *group* is the

name of the list you want, followed by your first name and your last name).

CANCELING YOUR SUBSCRIPTION Maybe signing up for that maltose discussion group wasn't such a good idea after all. To cancel a Listserv subscription, send e-mail to the Listserv site (not to the group itself). In the body of the message (leave the subject blank), type SIGNOFF *group* (where *group* is the name of the list you no longer want).

I-Way Patrol

Freeware, Shareware, and More

Insites

BEYOND PORK BELLIES The Chicago Mercantile Exchange (CME) is the world's largest public market place, trading more than $200 trillion annually.
http://www.interaccess.com/users/wilbirk

NO WHINING ALLOWED Wine lovers will appreciate the University of Washington's World Wide Wine page.
http://augustus.csscr.washington.edu/personal/bigstar-mosaic/wine.html

KEYNES VS. GREENSPAN One of the best gopher servers on business economics is from Sam Houston State University. It also includes more than 160 pointers to other related sites.
gopher://niord.shsu.edu

POP GOES THE WEB Visit Warner Brothers Records' home page and get a list of REM's 1995 world tour dates, a 30-second Madonna video, Eric Clapton's biography, and other rock lore.
http://www.iuma.com/Warner/

CITY TO CITY TO CITY Travel to more than 20 cities worldwide without leaving your desktop. City.Net is a comprehensive, timely guide to travel, business, and government for cities around the globe.
http://www.city.net/

EYES TO THE SKIES If you have a fast connection (nothing slower than 14.4Kbps), check out the University of Bradford's Guide to Stars and Galaxies, a multimedia map to the heavens.
http://www.eia.brad.ac.uk.bt/

SOFTWARE SALE CyberSource markets more than 7,000 software titles through its software.net service. Most of the titles are delivered by overnight mail, but only a handful of them are downloadable (at least for now).
http://software.net

By RICH SCHWERIN. *I-Way report to share? E-mail NetHead Rich Schwerin at rschweri@pc.ziff.com.*

Free Stuff!

NetHead **Rich Schwerin:** Get more mileage from your modem.

Business Planning Tool
Organize and plan your projects, schedule jobs and meetings, and more.
Filename: projez.zip **Site:** http://www.pc-computing.ziff.com/~pccomp **Size/Time*:** 2MB/35:00 ★★★★

Security Utilities
Snoops be gone! Several useful password-protection gizmos and more for your desktop.
Filename: lockup.zip **Site:** ftp://oak.oakland.edu **Size/Time*:** 2MB/35:00 ★★★★

Shakespeare Sampler
Speedy modem? Then check out a hefty sampling of England's unrivaled playwright.
Filename: willie.zip **Site:** gopher://etext.archive.umich.edu **Size/Time*:** 3MB/48:00 ★★★

Income Statistics
Keeping up with the Joneses? Find out with U.S. government regional economic statistics.
Filename: cash.zip **Site:** gopher://gsfc.nasa.gov **Size/Time*:** 1MB/25:00 ★★

Windows Utilities
Fun, practical desktop utilities for your Windows machine (trash can included).
Filename: neato.zip **Site:** ftp://garbo.uwasa.fi/ **Size/Time*:** 1.3MB/33:00 ★★★

Government Information
Your taxes at work: Here's a list of committee assignments for the House of Representatives.
Filename: beltwy.zip **Site:** gopher://wiretap.spies.com **Size/Time*:** 1MB/25:00 ★★★

Ultimate Geography
Who needs Carmen Sandiego? Quizzes, trivia, and state-by-state information.
Filename: geopak.zip **Site:** ftp://oak.oakland.edu **Size/Time*:** 2.2MB/36:00 ★★★★★

Windows Stickup
Look out 3M! Reminder is a shareware app that offers electronic sticky notes.
Filename: remind.zip **Site:** http://www.pc-computing.ziff.com/~pccomp **Size/Time*:** 1.5MB/30:00 ★★★★★

PostScript Utilities
PostScript printing? Try these conversion utilities and the Ghostscript font package.
Filename: postuz.zip **Site:** ftp://oak.oakland.edu **Size/Time*:** 1.7MB/41:00 ★★★

New Wallpaper
Tired of the same old Windows wallpaper popping up at you each day? If so, this pack's for you.
Filename: walpap.zip **Site:** ftp://garbo.uwasa **Size/Time*:** 1MB/15:00 ★★★★

*ALL DOWNLOADS ON PC CONTACT. FILE SIZE = ZIPPED BYTES; DOWNLOAD TIME (MINUTES:SECONDS) @ 9,600 BPS

Package Deals: Coolware Wrapped and Ready

NetHead Ratings: ★★★★★ Three weeks in Costa Rica. ★★★★ Skiing epic Utah powder all season. ★★★ A weekend in Reno. ★★ Two weekends in Reno. ★ An evening in jail.

I-Way Patrol   PC Contact and World Wide Web Directions

Join PC Computing Online

PC Contact All public-domain and shareware programs and utilities featured in *PC Computing* each month are available on our online service, PC Contact. Current CompuServe or ZiffNet members type GO ZNT:PCCONTACT at any CISI prompt. Cost varies depending on which CompuServe plan you belong to and the speed at which you connect. For complete membership and hourly rate information, type GO RATES while online.

ZiffNet users pay a monthly membership fee of $2.95. This support fee provides a variety of free and chargeable services. For the latest information about these services, type GO ZNT:ZIFFHELP and download the text files called GOWORD.TXT and FREE.TXT.

from data library 1 (General Information).

Follow these steps to join ZiffNet and participate in the PC Contact forum:

1 Set these modem and software parameters: 7 data bits, even parity, 1 stop bit, full duplex.

2 Call CompuServe's sales department at (800) 848-8199 from the United States and Canada. From other countries, dial CompuServe direct at (614) 457-8650. You can also call CompuServe with your modem. Set your modem as instructed above and dial (800) 346-3247. Press Enter when your modem connects. Type PHONES at the HOST NAME prompt, press Enter, and follow the onscreen prompts

to find a local access number.

3 Dial the access number with a modem. When it connects to the network, press Ctrl-C to get the system's attention.

4 At the HOST NAME prompt, type CIS and press Enter.

5 At the USER ID prompt, type 177000,5300 and press Enter.

6 At the PASSWORD prompt, type PC/CONTACT and press Enter.

7 At the ENTER AGREEMENT NUMBER prompt, type PCC95 and press Enter.

Live Internet Map: Visit *PC Computing*'s Web Edition and check out our Internet map that features live links to other sites on the Web. You'll also find the latest features, reviews, and commentary. http://www.pc-computing.ziff.com/~pccomp.

THE INTERNET $9 CRUISE

EASY RIDER.

Pop A Wheelie On The Internet.

Open your Windows to
the World of Internet.

Internet
Chameleon
NETMANAGE

NETMANAGE

1994 Dvorak PC Telecommunications Excellence Award for Outstanding Internet Front-End

MICROSOFT
WINDOWS

Rule The Road. Throttle up and tool down the Internet. Ride Internet Chameleon straight into Hog Heaven. Well equipped to explore the road and hit all the hot spots. Hey, who says you were born to be mild?

All The Tools To Rule The Road: WebSurfer, Email, NEWTNews, File Transfer, Gopher, and more!

Book the $9 Internet Cruise: Test drive the smoothest Internet front-end around. Take the $9 Cruise and pick-up free highway fare. Call us: **1-800-558-7855** Ask for Department E3

1. The logical way.
The Sound Blaster™ Discovery CD™ 16
kit includes everything you need to
explore the expanding universe of
multimedia. And now it's more afford-
able than ever. You get a Sound Blaster
16-bit sound card, double-speed CD-
ROM, stereo speakers, microphone,
and 15 cool software titles.
SRP, $349.95

2. The intelligent way.
Sound Blaster Digital Schoolhouse™
is the antidote to mindless video
games. It turns an ordinary PC into
an awesome educational system that
makes even math and spelling cool.
You get a Sound Blaster 16-bit sound
card, double-speed CD-ROM, plus
20 of the hottest educational software
titles and more. SRP, $399.95

3. The take-no-prisoners way.
The most powerful forces of the
gaming universe have come together.
And now they're coming to get you.
Game Blaster CD™ 16 brings together
a Sound Blaster 16-bit sound card,
double-speed CD-ROM, plus games
to die for, like *Rebel Assault* and *SIM
City 2000*. So be careful out there.
SRP, $549.95

Six new ways to blast into multimedia.

4. The ultimate way.
Educational software, games, cool
creative software. The Sound Blaster
Edutainment CD™ 16 gives you a Sound
Blaster 16-bit sound card and double-
speed CD-ROM. Not to mention over
40 of the planet's most captivating soft-
ware titles and lots more. Or get the
same kit with an external CD drive in
the Sound Blaster Edutainment EZ™ 16.
SRP, $599.95   EZ SRP, $749.95

5. The fastest way.
The Creative OmniCD™ 4x is the
leanest, meanest CD-ROM upgrade
in the cosmos. This quad-speed CD
drive makes all your software more
exhilarating. And it makes you more
productive. With 6 cool software titles,
you can dive into multimedia right out
of the box. SRP, $549.95

6. The bogus way.
Sure, there are other ways to get into
multimedia. But why take a chance?
Sound Blaster sound cards and kits are
the multimedia sound standard. All the
hottest games and software are made
to be played on Sound Blaster. Other
systems don't seem as real or as cool.
And neither do the people who
play them.

Of course, all these kits give you 100% Sound Blaster compatibility. And all the technical help
you need is just a phone call away. So installation is a no-brainer. Want more information?
Just visit your nearest Creative Labs dealer. Or call 1-800-998-5227 Ext. 110.

Circle 253 on reader service card.

CREATIVE
multimedia iSo Creative

CD-ROM White

AT THE MOVIES

Y ou don't actually *go* to the movies. And you avoid the popcorn that stuffs you so full of cholesterol you look like Rush Limbaugh. Your movie choices are from cable TV and video stores, where the ratio of hits to bombs is 1 to 100. To find the hits, you want a CD-ROM guide. Alternatively, you could just spin a CD-ROM.

Two Thumbs Up: Cinemania '95 has color, noise, action, and depth.

CINEMANIA '95
⬤⬤⬤⬤⬤

I have seen the future of CD-ROM, and it is Cinemania '95. This, friends, is how a Windows CD-ROM should be made—rich content behind an easy, fun interface. Access 19,000 movie reviews by Roger Ebert, Pauline Kael, or Leonard Maltin, or look up the terms, history, and how-tos of moviemaking in an encyclopedia. Or just preview videos, sound clips, and photographs. Although there are only 20 film clips, they're all prime stuff: HAL in *2001: A Space Odyssey*, "As Time Goes By" from *Casablanca*, Scarlett O'Hara having a temper tantrum. Short on inspiration? Match a movie to your mood with Cinemania Suggests.

Cinemania '95 / Microsoft Home / (800) 426-9400, (206) 882-8080 / $59.95 est. street price / Reader Service No. 690

MEGA MOVIE GUIDE 3.0 ⬤⬤⬤

Mega Movie Guide is the perennial *other* movie CD. Version 3.0's new Windows look is easier to use and easier on the eyes, although it still needs some de-kinking. For example, in *The Glenn Miller Story*'s summary screen you click the button that indicates it won an award and are sent to the 1954 Academy Awards. But then you have to find the movie again by yourself—a lot of searching.

Mega Movie Guide claims 42,000 movie reviews and 39 film clips—roughly twice as many as Cinemania '95. Also, it has a nice Greatest Hits feature that displays the top films by decade. Nevertheless, this CD is not as satisfying as Cinemania '95. Most of the reviews are short and anonymous. (Rex Reed writes only 1,000 of them, and he's no match for the Ebert-Kael-Maltin

More, But Less: Mega Movie Guide bests Cinemania in quantity, not quality.

combination in Cinemania '95.) There's none of Cinemania '95's movie industry info either, and the ratings are inconsistent: Depending on whether you're looking at a summary, synopsis, or "in-depth" screen, *Jurassic Park* is rated two stars, three stars, and three-and-a-half stars. And nowhere does Mega Movie Guide say who provided these ratings.

To make matters worse, more than a dozen of the film clips are trailers for 1994 films. Sure, trailers are fun to watch, but I can't help feeling that when you limit film clips to only 39 movies, *The Flintstones* and *Timecop* don't really belong.

Mega Movie Guide 3.0 / InfoBusiness / (800) 657-5300, (801) 221-1100 / $39.95 est. street price / Reader Service No. 691

CRITERION GOES TO THE MOVIES ⬤⬤⬤⬤

If you're a movie connoisseur—which means you know the difference between Ingrid Bergman and Ingmar Bergman—then you've got to have Criterion Goes to the Movies. This Windows CD is actually an infomercial for the laser-disk movies in the Criterion Collection. But even if you don't have a laser-disk player, you'll appreciate the clips from 140 films—each one a bona fide classic.

Limited to these 140 films, Criterion doesn't have the breadth of Cinemania '95 or Mega Movie Guide, but the clips are carefully chosen and the newer films are presented in their original wide-screen format—something I haven't seen on any other disc about movies. There are no reviews from big-name critics, but an essay that's intelligent and hypertexted to other data on the disc accompanies each film. This CD is a tiny gem.

Criterion Goes to the Movies / Voyager / (800) 446-2001, (914) 591-5500 / $24 est. price / Reader Service No. 692

⬤⬤⬤⬤⬤ *An Oscar-winning performance.* ⬤⬤⬤⬤ *An Oscar nominee.* ⬤⬤⬤ *Your basic Roger Corman B movie.* ⬤⬤ *Stale popcorn.* ⬤ *An Oscar Meyer wiener.*

EPHEMERAL FILMS 1931–1960 ◆◆◆◆

Around the start of the sixties most of us traveled to a new universe called the modern world. Media archaeologist Richard Prelinger has collected educational films about the old universe on a Windows CD-ROM called Ephemeral Films 1931-1960. A 1951 film called *Dating Do's and Don'ts* warns young men against lunging for a good-night kiss (a similar film today would cover the correct use of a condom). Another film tells how the housewife of 1957 can achieve a stress-free life through tranquilizers. Yet another clip envisions a chrome-plated robot alleviating the drudgery of kitchen work. There are moments when that lost innocence is a bit sad. But mostly it's just a hoot.

Ephemeral Films 1931-1960 / Voyager / (800) 446-2001, (914) 591-5500 / $24 est. street price / *Reader Service No. 693*

SECRETS OF STARGATE ◆◆

If you're not a major science-fiction fan, skip to the next review. Now, how many of the rest of you think that *Stargate* is better than *2001: A Space Odyssey, Blade Runner*, and *Star Wars*? You need all the devotion to *Stargate* that a Trekkie has for *Star Trek* to appreciate this Windows disc. A CD-ROM could have been a perfect medium for showing how some of the special effects were done, but no, that would be too interesting. Instead, Secrets of Stargate is a collection of clips and interviews with some of the people who made the film. Unless *Stargate* changed your life, don't get this CD.

Secrets of Stargate / Compton's NewMedia / (619) 929-2500 / $30 est. street price / *Reader Service No. 694*

THE MASK: THE ORIGIN ◆◆◆

The best thing about The Mask: The Origin is that it doesn't have this generation's Jerry Lewis—Jim Carrey—in it. This Windows CD is a very literal translation of the politically incorrect comic book that inspired the recent film. It consists mostly of illustrations with actors reading speech balloons. There's none of the special-effects wizardry you would expect

after seeing the movie. Still, it's not as dorky as it sounds, at least not if you have a history of comics in your childhood.

The Mask: The Origin / Cambrix Publishing / (818) 992-8484 / $25 est. street price / *Reader Service No. 695*

A BRIEF HISTORY OF TIME ◆◆◆◆◆

Did you spend the sixties wondering what time really was, how the universe got started, and where it will end? Once the sixties ended, did you give up those questions? They're still valid, and A Brief History of Time on CD-ROM takes a quantum leap toward giving the answers. The entire text of Stephen Hawking's best-selling book is here, but exploring the universe through the disc's animations, graphics, and narration is better—especially with Hawking's computerized voice. You can explore ideas in any

Hawking's Universe: Cartoony graphics belie brain-baffling physics.

order or take a guided tour. Some interface touches are clever, such as the Hawking Craft that flies to black star Cygnus X1. Despite a sugar-coated interface, there's some meat to this CD. It requires diligence to comprehend such concepts as entropy and quantum physics. The good thing is that there's no pop quiz afterwards.

A Brief History of Time / Creative Labs / (800) 998-5227, (408) 428-6600 / $35 est. street price / *Reader Service No. 696*

RANDOM HOUSE ELECTRONIC DICTIONARY ◆◆◆◆◆

It's hard to knock the newly revised 315,000-word Random House Unabridged Electronic Dictionary on CD-ROM. Add

2,200 line-art illustrations and 115,000 spoken pronunciations for those hard-to-decipher words, and the result is a must-have reference tool. The other big unabridged CD-ROM dictionary, the Oxford English Dictionary, sells for hundreds of dollars. This bargain goes for $79, and for $21 more you also get it in hard cover. That's a deal that can't be beat.

Random House Unabridged Electronic Dictionary / Random House Interactive and Electronic Publishing / (800) 733-3000, (212) 751-2600 / $79 est. street price / *Reader Service No. 697*

THE WAY THINGS WORK ◆◆◆◆◆

Excuse me for a second. This CD is so great I feel tears welling up. I'm not being sarcastic. The Way Things Work, based on David Macaulay's terrific 1988 best-selling book, is a work of genius. It explains everything from simple levers to microprocessors, but expands on the book's whimsical drawings with animations, spoken narration, and a cast of woolly mammoths that subtly illustrates scientific principles. (The qualities of pitch and volume, for example, are illustrated by plucking a mammoth's tail.) As in some of the best children's games, clicking on various objects in an illustration will often produce some surprises, from a noise to a bit of slapstick. The only problem with this CD is that it's not a dedicated research tool. Rather, it's best to simply let one explanation lead you to another. They're all equally lucid in their descriptions of science and mechanics, and they're all beautiful fun.

The Way Things Work / DK Multimedia / (800) 225-3362 / $49.95 est. street price / *Reader Service No. 698*

Mammoth Fun: David Macaulay's explorations fill a killer CD-ROM.

Technolust

Your business doesn't grind to a halt just because you're on the road. Well, maybe it does, but it shouldn't when every piece of office equipment you need slips in and out of an overnight bag with ease. You *can* take the office with you, whether you're in a cab or a hotel room.

Sound Equipment: Pack a 486DX2 notebook like NEC's Versa S/50C, and take along the Z-Player for your CD-ROMs. Charge them with a 100-watt cigarette-lighter charger from Data-Doc, and dictate your thoughts on the Flashback (far left).

Versa S/50C / NEC Technologies / (800) 374-8000 / $2,799 est. street price / *Reader Service No. 701*

Z-Player / Zenith Data Systems / (800) 553-0331 / $499 est. street price / *Reader Service No. 702*

DDE MobilePower / Data-Doc Electronics / (800) 328-2362 / $99 est. street price / *Reader Service No. 703*

Flashback / Norris Communications / (619) 679-1504 / $249 est. street price / *Reader Service No. 704*

Stay in Touch: Get faxes and phone calls on Simon (near right), but give out two 800 numbers for pages—one for the no-cost, alphanumeric SkyWord pager and one for longer e-mail on the SkyCard PC Card pager (inside the Port Overnighter bag). Use the MegaHertz Cellular modem to connect to the office.

Simon / BellSouth Cellular / (800) 746-6672 / $500 est. street price / *Reader Service No. 705*

SkyWord and **SkyCard** / SkyTel / (800) 759-8737 / $249 est. street cost, service starts at $20 per month / *Reader Service No. 706*

Port Overnighter / Port Computer Briefcases / (800) 242-3133 / $159 est. street price / *Reader Service No. 707*

Megahertz Cellular / Megahertz / (800) 527-8677 / $219 est. street price / *Reader Service No. 708*

In and Out: Need to fax and photocopy? Wed the Citizen PN60 printer (far left) and the ScanMan PowerPage scanner (center) to your fax modem.

Citizen PN60 / Citizen America Corp. / (800) 477-4683 / $339 est. street price / *Reader Service No. 709*

ScanMan PowerPage / Logitech / (800) 231-7717 / $449 est. street price / *Reader Service No. 710*

BY MATTHEW LAKE

Ed**Bott**

NINETY-SOMETHING?

The Official Story: December 20, 1994—Microsoft today announced that Windows 95 may not be available until August 1995. The company made this announcement based on its continued commitment to deliver a vigorously tested product of the highest quality . . . . Brad Silverberg, senior vice president of the Personal Operating Systems Division at Microsoft, said, "We have always said we will ship this product when it is ready, and that is what we are committed to do."

The Inside Story: There are two kinds of people—those who believe in conspiracy theories, and those who are too blind to recognize a conspiracy when they see one.

Will you really be able to buy a shrink-wrapped copy of Windows 95 in August of this year? Take the new, official release date with a grain of salt. In fact, after reading through a mountain of old news clippings, I've decided to buy my own salt mine. I've also filed the whole mess under W, for "Wishful Thinking."

Maybe someone settled on the Windows 95 logo too early. Maybe it's time to bring back the Chicago code name. Maybe Windows Ninety-something is more like it. Maybe the conspiracy theorists are right after all.

Take your pick from the following assortment of semi-plausible explanations for Why Windows 95 Is Taking So Damned Long:

• **Microsoft is plotting to sink Lotus and WordPerfect.** While its rivals sink precious R&D dollars into 32-bit Windows 95 upgrades, they're 16-bit versions sit on the shelves. Meanwhile, Microsoft is selling 2 million copies of Windows 3.1 and DOS per month. Windows 95 is a pipeline full of profits that Microsoft can turn on anytime. Better to wait until the competition is suitably softened up.

Check the second-quarter earning forecasts before settling on the real release date.

• **Windows 95 is just a placeholder for NT.** John C. Dvorak started this one by labeling Windows 95 an "insincere" product. Dvorak the conspiracy theorist lays it out like this: "By stalling on Chicago . . . and recently issuing edicts to software developers about use of the Windows logo, Microsoft has signaled its true intention: To

Windows 95: The Countdown

Spring Break in Seattle? August might as well be in the next millennium—the Windows 95 target date to watch is March 31, when the $30 Preview edition (a.k.a. version 1.0) is due.

make Windows NT the desktop standard." This column appeared in *PC Magazine* on the 31st anniversary of JFK's assassination. Coincidence? There are no coincidences. According to this theory, the new Windows will ship on November 22, 1995.

• **IBM walked right into Microsoft's trap.** The unrealistic early deadlines for Windows 95 were a ploy to trick IBM into

rushing a buggy version of OS/2 Warp to market and reaping a bumper crop of bad publicity. It would have worked, too, except that the Pentium's floating-point bug stole all the headlines.

• **It was an innocent mistake.** The schedules were calculated using first-generation Pentiums and the floating-point errors got worse and worse each time someone pushed Excel's recalc button. (You didn't read about that one? Obviously a cover-up.)

• **It's the Uma Thurman virus.** I don't have all the details yet, but it has something to do with Penn Jillette, who's angry that *PC Computing* is plastering Windows 95 all over *his* page. Apparently he sent an irresistible screen-saver module to a few key developers in Redmond and the disk had a little *something extra* on it.

• **It's the ultimate conspiracy theory.** The steady stream of embarrassing delays is designed to lull competitors into a state of smug complacency, sort of like the feeling you get after a full turkey dinner. While they aim for the new August deadline, Microsoft secretly has everything ready and releases Windows 95 plus a new version of Office in July. Three months later there's a new version of Windows NT with the Windows 95 interface seamlessly grafted on. I can't take credit for this one—the original concept is straight out of a classic Harlan Ellison sci-fi story.

Microsoft's Silverberg insists that the Windows 95 development team is on course. He says they've been concentrating since the first of the year on the Herculean task of debugging the new operating system so it installs flawlessly, even on systems stuffed to the gills with ancient hardware and clunky old DOS and Windows applications. Sound reasonable to you? Then you have no future in the conspiracy business.

CUT COSTS. N

Dell's featured artist is Wendy Grossman of New York, NY.